ISSN 2345-0282 ONLINE
http://doi.org/10.9770/jesi.2018.6.1

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

6(1)
2018

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1

Publisher
http://jssidoi.org/esc/home

Volume 6 Number 1 September 2018

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

2018
6(1)

Guest Editor-in-Chief
Prof. Rasa Subačienė

The *Entrepreneurship and Sustainability Issues* ISSN 2345-0282 (online) is a peer-reviewed journal, which publishes original research papers and case studies. It is international journal published cooperating with universities, social companies, consultancies and associations indicated on the cover of the journal. It is published quarterly.

Areas of research include, but are not limited to, the following:

- **Areas of research include, but are not limited to, the following:**
- **Conceptual/Practical Approaches and Methodologies towards Sustainable Entrepreneurship**
- **Globalization, Internationalization and Solutions for Low-Carbon Economies of Scope or Scale**
- **Innovations and Technology Transfer Pilot Results Advancing Entrepreneurship and Sustainability**
- **Information Technologies (IT) and Information Communication Technologies (ICT) for Entrepreneurship Sustainability, and Socio-Economic Innovations**
- **Environmental Engineering for Sustainability and Entrepreneurial Applications/Ventures**
- **Smart Electricity Grid Solutions for Sustainable Entrepreneurship**
- **Implementation of Renewable Energies (e.g. Harvesting, Storage, New Technologies Being Deployed/Developed, Innovative Market or Business Model Paradigms, etc.)**
- **Entrepreneurship, Security and Safety**
- **Sustainable Development, Entrepreneurship, Safety**
- **Threats to Society, Entrepreneurship and Regional Development**
- **Security and Safety of Countries, Regions and Society as Precondition of Sustainable Development and Sustainable Entrepreneurship**
- **Boarder Guard Issues. Regional Development and Entrepreneurship**
- **Migration and Sustainable Regional Development and Entrepreneurship**
- **Terrorism, International Crime, Regional Development and Sustainability**
- **Security and Safety Models for Sustainable Development of Societies and Businesses**
- **Emerging Business Drivers, Opportunities, or Constraints in Future Sectors of Current Markets**
- **Retrofitting Techniques and Technologies Near-Zero Energy Demand Buildings**
- **Urban Planning and Advanced Construction Materials for Energy-Efficiency or Smart Cities**
- **Modern Economics in the Context of Security, Comfort, or Legislation**
- **PPPs for Developments in Sustainable Entrepreneurship, Finance, and Investments**
- **Accounting and Entrepreneurship Issues**
- **Sustainable Entrepreneurship in the Context of Management or Life-Long Learning**
- **Strategic Management Practices and Creative Marketing Techniques for Sustainability**
- **Organizational Studies and Sustainable Entrepreneurship**
- **Entrepreneurship in the Context of Marketing, ICT, and Creative Industries**
- **Intercultural Communication for Sustainable Entrepreneurship**
- **Institutions and Entrepreneurship**
- **Case Studies on Entrepreneurship and Sustainable Development**
- **Social Cohesion and Social Innovation and Social Entrepreneurship**
- **Business Models and Strategic Management for Sustainable, Secure and Safe Futures**
- **Corporate Social Responsibility and Sustainable Development**
- **Entrepreneurship in the Context of Psychology, Education, or Women**
- **Intuitions about Emerging Phenomena in Business and Society**
- **Start-Ups, Spin-Offs, SMEs in the Context of Market Growth And Exit**
- **Global Value Chain Management for Sustainable Entrepreneurship**
- **Knowledge Management for Sustainable Entrepreneurship, Safety and Security**

All papers published in the *Entrepreneurship and Sustainability Issues* are indexed/abstracted by:

Web of Science

Clarivate Analytics

Scopus - Coverage starting with 2017 material

- ECONIS of the ZBW – Leibniz Information Centre for Economics *http://www.zbw.eu/*EconBiz
- RePEc *http://repec.org/*EconBiz
- Ulrich's Periodicals Directory
  Serials Solutions *http://www.serialssolutions.com/*
- ProQuest business *http://www.proquest.co.uk/en-UK/*
- Crossref
- Google Scholar
- The European Library *http://www.theeuropeanlibrary.org*
- Database Lituanistika *http://www.lituanistikadb.lt*
- Index Copernicus International

Publisher:

ENTREPRENEURSHIP AND SUSTAINABILITY CENTER
http://jssidoi.org/esc/home

Editorial correspondence including manuscripts and submissions:

Prof. dr. Manuela Tvaronavičienė
Tel.: +37068783944
E-mail: submissions@jssidoi.org or manuela.tvaronaviciene@jssidoi.org

Volume 6 Number 1 September 2018

FOREWORD to

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES,

2018 Volume 6 Number 1 (September)

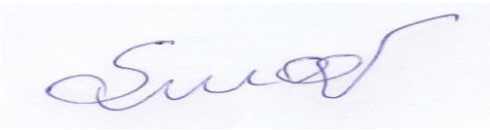
Dear readers,

Entrepreneurship and sustainability are wide categories, which drive development of any sphere starting from politics of the country, its economics, government, business management, personal life of population, etc. Those categories are necessary for constant movement forward, creation and realisation of the ideas, and make impact not only on the development of separate spheres of any country, but to the whole development of the country in general terms, too.

Entrepreneurship and sustainability are also very important notions for evolution of science as together they mean the process of creation, development and implementation, which leads to the disclosure of undiscovered directions.

The journal "Entrepreneurship and Sustainability Issues" is the best platform for sharing the already implemented ideas, for cooperation in creation of the new ones, for sharing insights of new aspects and directions of the development of entrepreneurship and sustainability issues.

With best regards



Professor Rasa SUBAČIENĖ

Guest Editor-in-Chief

Vilnius University, Lithuania

Iš čia kylama
į žvaigždes

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

PROBLEMS AND SOLUTIONS OF ACCOUNTING AND EVALUATION OF BIOLOGICAL ASSETS IN LATVIA

Iluta Arbidane[1], Iveta Mietule[2]

[1,2] Rezekne Academy of Technologies, Atbrivosanas aleja 115, Rezekne, Latvia, LV-4601

E-mails:[1] Iluta.Arbidane@rta.lv; [2]Iveta.Mietule@rta.lv

Received 28 March 2018; accepted 10 May 2018; published 30 September 2018

Abstract. Activities in the field of agriculture deal with plants and animals constituting biological assets of the sector. From the point of view of accounting and valuation, biological assets is a scarcely investigated topic in Latvia, as well the object of the research only in general terms is reflected in Latvian legislation. That leads to confusion and uncertainty in evaluation and accounting of biological assets in the practical accounting. The subject of the study: evaluation and accounting of biological assets. The aim of the study is to explore and analyse problems of accounting and evaluation of biological assets in Latvia and to propose solutions. One of the research tasks is to explore the current legal base for evaluation and accounting of biological assets provided in the national legislation, to evaluate how it complies with the international accounting standards and to analyse the experience of other countries. The challenging issues of evaluation and accounting of biological assets in Latvia are defined in the research, possible solutions for improving the quality of accounting of biological assets are developed proposing the necessary amendments to the legislation and revisions to the methodological documents. Methods of the research: monographic/descriptive method, document analysis, and graphical analysis.

Keywords: biological assets, evaluation, accounting, agricultural

Reference to this paper should be made as follows: Arbidane, I.; Mietule, I. 2018. Problems and solutions of accounting and evaluation of biological assets in Latvia, *Entrepreneurship and Sustainability Issues* 6(1): 10-22. http://doi.org/10.9770/jesi.2018.6.1(1)

JEL Classifications: M410

1. Introduction

Agriculture is the sector, where accurate and correct counting and valuation of biological assets play a key role in the accounting and annual reporting process. “Biological assets” is a relatively new concept in the Latvian accounting system, so there are potential uncertainties about their evaluation and recording in the company's accounting system. **The research problem**: the legal acts of the Republic of Latvia do not sufficiently and

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

unambiguously explain the principles of evaluation and accounting of biological assets. **The study's aim**: to explore and analyse problems of accounting and evaluation of biological assets in Latvia and to propose solutions. **The subject**: evaluation and accounting of biological assets. **Methods** of the research: monographic/descriptive method, document analysis, and graphical analysis. **Novelty** of the research: the normative acts on the basic principles of evaluation and accounting of biological assets in the Republic of Latvia have been investigated. In the process of the paper development, research and analysis of the available information was carried out, concluding what are the issues of the evaluation and accounting of biological assets and their possible solutions. The authors of the paper have examined the differences in evaluation and accounting of biological assets in Latvia, Estonia, and Lithuania.

Agriculture is one of the eldest human activities and has an important role in global economy by its generated economic resources (Mates, Grosu, 2009). The agriculture sector is an important element of the global economy, nevertheless accounting of its activities has had little attention from the accounting standard developers as most business applications focus on production, marketing, or tax reporting (Fischer, Marsh, 2013). As well agriculture accounting has attracted not as much of attention from the researchers and accounting standard regulators until the International Accounting Standard (IAS) 41-Agriculture was adopted (Herbohn and Herbohn, 2006).

The key production elements of an agricultural company are its biological assets, and the company profit depends on the efficiency of the management of these assets (Ore, 2011). Ore in her research has explored theoretical concepts in accordance with the International Accounting Standard (IAS) 41-Agriculture that could be important and may serve as a basis for elaboration of Latvian Accounting Standards (LAS) for "Biological Assets" or "Agriculture".

In Latvia, issues of accounting and evaluation of biological assets have been studied only by Ore (2011) and Jesemchika (2010). Despite the suggestions proposed by the authors, the legislator haven't paid appropriate attention to the legal regulations of accounting of biological assets. At the beginning of the century, in Latvia, eleven Latvian Accounting Standards (LAS) were developed, which along general lines are in accordance with accounting regulatory enactments, the European Community Law and the International Accounting Standards. LAS were not approved, consequently, they are not applicable at the moment. It should be noted that agriculture issues are not explained in any of the standards, contrary to the standards existing in Estonia and Lithuania. As there are no national accounting standards for the accounting of biological assets, the national legislation and laws as well as IAS 41-Agriculture are used in accounting.

When evaluating the number of agricultural enterprises in Latvia, it can be concluded that their number is noteworthy (Table 1).

Table 1. Changes in the number of agricultural enterprises from 2013 to 2017

Year	Number of agricultural enterprises	Share of agricultural enterprises in the overall structure of enterprises (%)
2013	27517	16,6
2014	26619	15,4
2015	27299	15,0
2016	28201	15,0

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

Source: Compiled by the authors according to data of the Latvian Central Statistical Bureau

Table 1 shows the number of economically active enterprises, whose activity is forestry and agriculture by the NACE classifier. By legal form, they are self-employed persons, farms and fisheries, individual commercial entities, and commercial entities with the main type of activity – agriculture. In 2014, share of agriculture, forestry and fishery in the gross value added was 3,5%; in 2015 – 3,4%; in 2016 – 3,2%. These indicators are similar in Lithuania and Estonia as well. In 2016, share of agriculture, forestry, and fishing was 3,3% of the gross value added in Lithuania and 2,9% in Estonia.

2. Definition and classification of biological assets

In Latvia, the principles for preparation of annual accounts, including classification and accounting of balance sheet items, are governed by the Law On the Annual Financial Statements and Consolidated Financial Statements (22.10.2015). The law states that the biological assets are labour or productive animals or plants that the company holds in order to obtain agricultural products for sale or to use them as additional biological assets. In Annex 1 to the regulatory enactment, a scheme balance sheet is established. According the law, biological assets are included under the following positions:

- Long-term investments;
- Current assets.

It must be concluded that the law and its binding regulations do not further clarify the concept of biological assets and do not specify the classification principles for animals and plants to be indicated as “Biological assets” under the item of long-term investments or current assets. The provisions for the use of certain items in the balance sheet stipulate that the item "Biological assets" is used only by a company, which in accordance with the international accounting standards, recognizes, assesses and reflects biological assets in the financial statements.

In accordance with IAS 41-Agriculture, the standards are applied to an agricultural product that is harvested from the biological assets of enterprise at the time of harvesting. Consequently, biological assets can be living animals or plants. The entity recognises a biological asset or agriculture produce only when the entity controls the asset as a result of past events, it is probable that future economic benefits will flow to the entity, and the fair value or cost of the asset can be measured reliably. Agricultural activity is the biological transformation of biological assets or the management of biological assets carried out by the enterprise in order to transform biological assets into agricultural products for sale or for use as the additional biological assets (IAS 41-Agriculture).

Biological assets are divided into groups that have some common characteristics. However, in order to divide biological assets in groups and their components, there must be a homogeneous nature of the assets and the purpose of their use. Agricultural products are products obtained from the company's biological assets. In turn, the finished products for sale are produced by processing agricultural products.

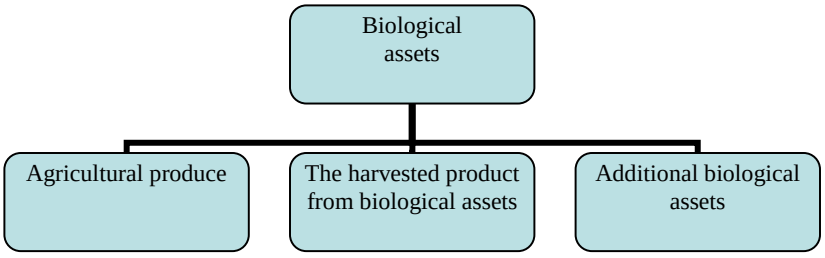


Fig.1. Transformation process of biological assets.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

Source: Compiled by the authors according to IAS 41-Agriculture

As shown in Figure 1, in the process of transformation of biological assets, products from biological assets are produced/ harvested, as well some biological assets are obtained from the assets themselves

Table 2. The most common biological assets, agricultural products and additionally obtained biological assets in Latvia

Biological assets	Agricultural produce	The harvested product from biological assets	Additional biological assets
Pigs	Pork, leather	Pork products, leather products	Piglets
Rabbits	Meat, furskin	Meat products, fur	Rabbits
Dairy cattle	Milk	Milk products	Calves
Meat cattle	Beaf	Beaf proucts, leather	Calves
Horses	Horsehair	Horsehair products	Foals
Sheep	Wool, meat	Yarn, clothes, meat products	Lambs
Poultry	Eggs, poultry meat, feathers	Poultry and egg products, down	Chikens, ducklings, gooslings
Bees	Honey, pollen, wax	Wax products, bee bread, homeopathic and cosmetic products	Queen bees
Snails in aviary	Collected snails	Food, cosmetology products, homeopathy	Baby snails
Cereals	Grains, straw, seeds	Bread, malt, hay, etc,	Cereal sprouts
Potato plantings	Potatos	Potato starch, potato products	Potato seedlings
Fruit and berry trees	Pickled fruits, berries, seeds	Jam, juice, frozen products, etc.	Saplings, sprouts and shoots
Ornamental plants, annuals and perennials	Cut flowers, ornamental bush branchesm seeds	Floristry products	Saplings, sprouts and shoots of ornamental plants
Trees planted in forest	Logs, seeds	Timber products	Saplings of trees
Freshwater fish	Caught fish	Fish products	Fry

Source: Compiled by the authors according to IAS 41-Agriculture

The biological assets can be classified either as mature or immature assets. The mature biological assets are the ones that achieved harvest characteristics and therefore are consumable biological assets. This category also comprises the biological assets that can be periodically harvested (in case of the bearer biological assets) (Lefter, Roman, 2007).

Biological assets can be classified according to several qualities:

- time of use or time of preparation for use;
- signs of maturation or ripeness;
- possibility of gaining economic benefits several times, i.e., additional biological assets and agricultural produce.

According to the classification by duration of use or preparation for use, long-term biological assets are capable of producing agricultural products and/or additional biological assets, providing additional economic benefits to the enterprise over a period of more than 12 months. In turn, short-term biological assets include plants and animals

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

that provide economic benefits for up to 12 months. Such classification of biological assets is economically justified because, indeed, each company invests funds with the idea of obtaining future economic benefits.

Classification of biological assets by signs of maturation or ripeness indicates to the biological assets whose production cycle exceeds 12 months (except for fattening cattle) and those that during the reporting period are unable to provide agricultural produce and/or additional biological assets in a certain quality. Using this classification, it is possible to obtain information about the potential cash flow expected in the next reporting period.

These two types of classifications allow biological assets to be divided into homogeneous groups. These classifications, depending on the needs of enterprises, can be modified and further categorized according the physical properties of biological assets. Creating a classification containing smaller groups makes accounting easier.

The classification of biological assets by capability providing economic benefits several times, i.e., additional biological assets and agricultural production. This type of classification of biological assets provides assistance in obtaining information about the possible cash flow not only in the following reporting year, but also over a longer period of time.

The authors believe that the first two types of classification of biological assets are the most advantageous from the accounting point of view, while agricultural companies that want to maximize profits should use the third type of biological asset classification.

3. Recognition and evaluation of biological assets

IAS 41 "Agriculture" can serve as a guideline. The application of this standard provides the possibility to evaluate biological assets, using equal criteria and determining fair values. The abovementioned standard is applicable in cases when the agricultural activity is linked with

- Biological assets;
- Agriculture produce at the point of harvest;
- Government grants under certain conditions.

The standard states that "A biological asset shall be measured on initial recognition and at the end of each reporting period at its fair value less costs to sell, except for the case where the fair value cannot be measured reliably."

The Annual Accounts Law, allows the evaluation of biological assets in their fair value. In order to be able to do it, one of the following parameters has to be abided by:

- the biological asset objects have active market and permanently available market prices;
- it is possible for the biological asset objects with other recognised methods to specify the fair value at the current location and condition thereof.

However, by not addressing the question of determining the fair value of biological assets, we end up in a situation where the value of these assets is false, and we can't fairly evaluate the financial situation and viability of enterprise (Rivzha, Ltimira, 2015).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

Recognition of permanent plantations takes place in several stages:

- New plantations are recognized at a value equal to the actual planting costs;
- When the exploitation age is reached, they are estimated at a value equal to the cultivation costs plus the amount determined in the first stage, i.e., the actual cost price;
- If plantations that have already reached the exploitation age are purchased, they are accounted for by the acquisition value.

Animals are valued at the acquisition or production cost or at the lower market prices on the balance sheet date. Productive and working animals are accounted for at their initial value that is formed by adding the acquisition expenses to the acquisition or production costs.

There is particular attention provided to the evaluation issues in the International Accounting Standards, because evaluation is a process of determining monetary units in which the elements of financial statements are recognized and evalued in the entity's balance sheet and profit and loss account. Therefore, it is necessary to choose a particular method for this purpose. The evaluation of biological assets raises problems when there is no single evaluation system determined by, for example, the national standard. Accounts of agricultural businesses in one business sector are incomparable, since every of them uses its own method.

When evaluating biological assets, it should be taken into account that the period of growth of biological assets, in particular long-term plantations and productive animals, is of a lasting nature, and the changes in their fair values during the growing period are significant. If biological assets were valued at the cost price over their entire growth period and would not periodically be revalued at the highest fair value, recognizing their fair value changes in the profit or loss, the income statement would not reflect the economic substance of the biological assets. Therefore, there is a need for a regular revaluation of biological assets at their fair value. The presentation of changes in fair value in the profit and loss account is required for the income, derived from biological assets, to be applied to the reporting periods, when the income is actually earned. Jesemchika (2010) thinks similarly, emphasizing that Latvian legislation does not specify the stage of recognition, which creates confusion in the interpretation of accounting data.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

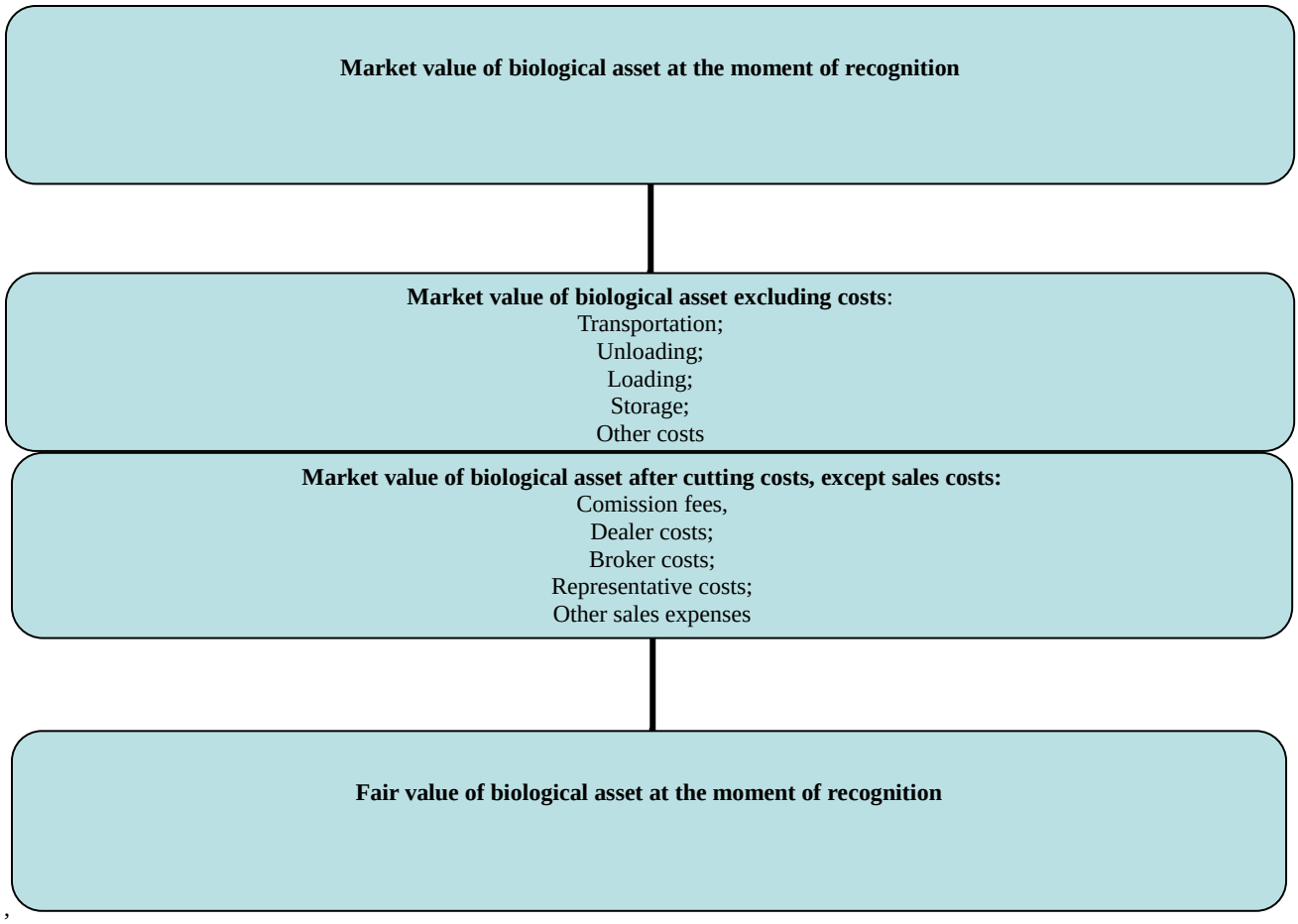


Fig.2. The process of establishing the fair value of biological asset.

Source: Compiled by the authors according to Law on the Annual Financial Statements and Consolidated Financial Statements Latvia and IAS 41-Agriculture

The term "fair value" was introduced in the Latvian accounting laws and regulations in 2003. Law On the Annual Financial Statements and Consolidated Financial Statements defines the concept of “fair value” as the amount received for selling the asset or paid in the normal course of transaction between market participants at the moment of valuation of that asset or liability.

Latvian legislation allows evaluation of biological assets at the fair value less costs, deducting the sales costs if one of two conditions is met, that is, (1) an object of biological assets has active market and permanently available market prices and (2) it is possible to determine the reliable fair value of an object of biological assets using another recognized method at its current place of recognition and condition.

As mentioned above, agricultural products can be obtained from biological assets, while the final products can be obtained from agricultural products. Agricultural products should be valued at their fair value, deducting the estimated point-of-sale costs in the period of harvesting. The evaluation of an agricultural product is on the date of payment, when the 2.IAS Inventory or other relevant standard is applied.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

Table 3. Methodology for determining the value of biological assets

By cost method	By fair value in an active market	
	Active market available	Active market unavailable
Choice of cost model	Calculation of the value of the biological asset at active market prices	Calculating the value of a biological asset using value estimation models
Changes in the estimated cost of an item (+/-) at its actual cost	Estimated sales value	Calculation of the value reduction method
Balance sheet value (initial value after adjustment, taking into account changes)	Calculation of possible costs	Calculation of the lifetime of a biological asset
	Balance sheet value (fair value and cost difference)	Balance sheet value (fair value and depreciation)

Source: Compiled by the authors according to Law on the Annual Financial Statements and Consolidated Financial Statements Latvia and IAS 41-Agriculture

In Latvia, preference is given to the evaluation of biological assets at the fair value, and accounting of biological assets at cost price is offered only as an alternative method. During the evaluation of biological assets, it is necessary to assess the conformity of the cost price of a particular asset with its realisable value and choose the most prudent evaluation method (Gulbe, 2015). By assessing, which method of biological assets' evaluation is easier to use, one can conclude that the choice of a method depends not only on the qualification of the accountant, but also on factors such as the availability and quality of statistical information, the flow of the company's information, legislative norms, etc.

4. Biological assets accounting and evaluation problems in Latvia

In order to be able to enhance the accurate inventory of biological assets in agricultural holdings, it is necessary to identify current problems and find suitable solutions both from the business community and from the state point of view. In order to facilitate the accurate and prompt accounting in different sectors and businesses, the extensive information both in national regulatory enactments and in international standards on the various aspects of accounting and asset valuation should be available. The authors conclude that sufficient and comprehensible explanatory information regarding the evaluation and accounting of biological assets in Latvia is not provided. Kalnina (2014) points to a number of problems related to the indication of biological assets (animals) in the financial statements. The legal acts of the Republic of Latvia do not explain the accounting principles of biological assets.

Plants and animals are represented in the balance sheet in both inventories and fixed assets. The fixed assets account for working animals and productive animals that meet the criteria of fixed assets. Other animals that do not qualify for recognition of fixed assets are listed in stock. Agricultural enterprises need to determine in their accounting policy whether some of the animals are classified as fixed assets. Taking into account that before introduction of the item "Biological assets" all animals were envisaged to be listed as current assets without providing information requested by the regulatory enactments, many companies continue to list all animals as current assets. That way, they protect themselves from the misinterpretation of the rules of law.

Nowadays, agricultural companies specialize in breeding one kind of livestock for the production of certain commodities, for example, breeding milk cattle for milk production. Therefore, it is not possible to provide the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

accounting advice that would be equally acceptable for all agricultural enterprises for organization of animal bookkeeping.

In the meaning of the provisions of Law On the Annual Financial Statements and Consolidated Financial Statements of the Cabinet of Ministers, plants are live crops (for example, fruit and berry trees and bushes, cereals, legumes, grasses, root vegetables, herbs, flowers) and wild plants (such as trees and bushes in forest, plants in natural meadow), while perennial plantations are crops that grow on a long-term basis on a given plot of land and give a crop several times (for example, gardens of fruits and berries, including strawberries), as well as nurseries of ornamental and fruit trees and bushes. A proper understanding of the distribution of plants in mono and multi-annual is an essential condition for correct balancing. As accounting practice in Latvia shows, this aspect raises difficulties in cases when an outsourcing company, where the responsibilities of accountants are divided and there is no common understanding about the specifics of the company's work, handles accounting.

The authors believe that one of the aspects in the accounting of biological assets that may contribute to erroneous accounting is that both in case of long-term and short-term biological assets both animals and plants are reflected in one item. That do not provide a clear picture of the biological assets owned by the farm (share of animals and plants).

As far as the assessment of biological assets is concerned, it should be taken into account that there is no active market for most of biological assets and there is no precise information about the value of those assets. This is one of the main reasons why it is rather difficult to apply the principle of fair value in the evaluation of biological assets. According to the Law on the Annual Financial Statements and Consolidated Financial Statements, biological assets are valued at their acquisition or actual production costs and they are gradually depreciated. The legislative norms of the Republic of Latvia do not allow to address issues regarding the determination of the true value of biological assets. As a result, the value of assets is false and it is not possible to fairly assess the company's financial position and viability. A similar view is expressed by Rivzha, Latimera (2015) that the negative consequence of the lack of guidelines and criteria for evaluating biological assets in Latvia is a chaotic and incomparable information on biological assets in annual reports. By examining the experience of legislation of the Republic of Lithuania in relation to biological assets, 17th accounting standard "Biological assets" is applied in the territory of the Republic of Lithuania. This is a significant relief for accountants, as this normative act clarifies and explains the methods of recognition and evaluation of biological assets and the peculiarities of their use. The fair value of biological assets and agricultural products is easier to identify when assets are classified according to their essential characteristics, such as age, weight, quality. Taking into account the classification of biological assets or agricultural products, it is easier to determine their market value. If there is no active market, the fair value of biological assets and agricultural products in the company is determined on the basis of the last transaction price. If the last transaction price and market price significantly differ, the company must find out the reason for the price difference and choose the safest method for determining the fair value of biological assets. From the moment a farmer has chosen the method of evaluation of biological assets - this should be presented in the company's accounting policy. However, if an agricultural enterprise cannot reliably estimate the fair value of biological assets and agricultural products, the standard values approved by the Ministry of Agriculture of the Republic of Lithuania can be used. The authors believe that the process of evaluating the fair value of biological assets and agricultural products is substantially facilitated by the fact that the values presented in the agricultural company’s accounting are legally validated, thus reducing the likelihood of errors in the assessment of biological assets.

In the Republic of Estonia, biological assets are accounted for in accordance with the guidance provided by the 7th Estonian Accounting Standard "Biological Assets" and its explanations. The purpose of this legislative act is to

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

reflect the rules that must be taken into account when accounting for biological assets. 7th Accounting Standard "Biological assets" provides for rules for the presentation of biological assets in the annual accounts and balance sheet of agricultural enterprises. The standard specifies the recognition and evaluation of biological assets from the initial acquisition value or, in the result of the repeated production process – from the duration of the realization or agricultural production. A large proportion of Estonian agricultural enterprises compile annual accounts on the basis of generally accepted accounting principles. By examining the 7th Estonian Accounting Standard "Biological Assets", it can be concluded that it provides not only a theoretical account of the evaluation and accounting of biological assets, but also examples that allow for a better understanding of these assets and the related economic operations. As the study by Bohushova, Svoboda, Nerudova (2011) suggests, the development of separate standards for the accounting and evaluation of biological assets is not widely practiced. However, the authors are convinced that the experience of Lithuania and Estonia is significant, as all three countries have similar historical experience and the accounting and evaluation of biological assets is a relatively common and important subject of bookkeeping. Consequently, there is a significant informative and methodological support from the legislator, which takes into account both international practice and national characteristics.

The authors believe that the procedure for the inventory and assessment of biological assets should be determined not only by the normative acts of national significance, but also by drawing up a model of the accounting of biological assets for agricultural enterprises. In Latvia, a regulatory framework should be developed to determine:
• possible methodologies and criteria for evaluation of biological assets;
• suitable classification.
The existence of such a document, written in a simplified language, would facilitate the process of evaluation and inventory of biological assets and would be an important incentive for the management of agricultural holdings. Moreover, that is essential in current circumstances, when the legislation on accounting allows the owner of the business to conduct accounting himself. That would also be an important contribution to comparing statistics between companies.

Table 3. Biological asset valuation and accounting problems and possible solutions in Latvia

Nr.	Problem	Possible solutions
1	There is no complete and unambiguous information on the assessment and accounting of biological assets in the legislation of the Republic of Latvia	The responsible departments of the Ministry of Finance of the Republic of Latvia are required to develop a bookkeeping and assessment methodological guidance for "Biological Assets" or "Agriculture" that would explain in detail the current principles of accounting and valuation of biological assets. Agricultural companies need to develop and validate accounting regulations that will ensure more efficient exchange of information between management and staff.
2	Representation of both animals and plants in one balance sheet item.	Legislation should extend the classification of the balance sheet items "Biological assets" into two sub-items: • long-term / short-term plantations; • long/short-lived animals.
3	A complex process for determining the fair value of biological assets.	The responsible officials of the Ministry of Agriculture of the Republic of Latvia should create a single database of the fair values of biological assets depending on the group of assets and changes in the agricultural sector. The example of Lithuania is noteworthy.
4	Agricultural activities influencing factors-climatic conditions and geographical remoteness.	The responsible officials of the Ministry of Agriculture of the Republic of Latvia are to develop an action plan to be implemented in order to reduce the negative impact of internal and external risks on the operation of the agricultural enterprise.

Source: Compiled by the authors

Conclusions

As a result, it is established that the existing legislation in Latvia regarding the evaluation and accounting of biological assets does not provide sufficient legal provisions, and clarification and comprehensibility of legislative acts. Taking into account the results of the research, as well as the experience of Lithuania and Estonia, it would be useful if the responsible departments of the Ministry of Finance of the Republic of Latvia would elaborate explanatory methodological guidelines for accounting and evaluation "Biological Assets" or "Agriculture" that would explain in detail current principles of accounting and evaluation of biological assets.

The authors believe that one of the aspects of biological assets' accounting leading to erroneous accounting is that both animals and plants are reflected under one item of balance sheet both as long-term and short-term biological assets. It does not provide a clear picture of the biological assets owned by the agricultural enterprise in terms of animal and plant groups. The legal acts should extend the classification of the balance sheet items "Biological assets" into two sub-items: 1) long-term/short-term plantations; 2) long living/short living animals.

The majority of biological assets in Latvia do not have an active market, and there is no precise information on the value of such assets. This is one of the main reasons why it is rather difficult to apply the principle of the fair value in evaluation of biological assets. According to the Law on the Annual Financial Statements and Consolidated Financial Statements, biological assets are valued at their acquisition or actual production costs, and they are gradually depreciated. The legislative norms of the Republic of Latvia do not allow to address issues regarding the determination of the fair value of biological assets. As a result, the value of assets is false, and it is impossible to fairly assess the enterprise's financial position and viability.

References

Bohušova, H.; Svoboda, P.; Nerudova, D. 2012. Biological assets reporting: Is the increase in value caused by the biological transformation revenue? *Agricultural Economics* 58(11): 520–532. Retrieved from: http://81.0.228.28/publicFiles/78750.pdf

Gulbe, S. 2015. Gada pārskata sagatavošana- ilgtermiņa ieguldījumi [Preparation of the annual report - long-term investments] *Finanses.lv*. Retrieved from https://www.grantthornton.lv/globalassets/1.-member-firms/latvia/pdf/s.gulbe-gada-prskata-sagatavoana-ilgtermia-ieguldjumi_2015-02.pdf

Fischer, M.; Marsh, T. 2013. Biological Assets: Financial Recognition and Reporting Using US and International Accounting Guidance. *Journal of Accounting and Finance; West Palm Beach*.vol.13: 57-74.

Herbohn, K.; Herbohn, J. 2006. International Accounting Standard (IAS) 41: what are the implications for reporting forest assets? Small-scale forest economics, *Management and Policy* 5(2): 175-189. Retrieved from https://link.springer.com/article/10.1007/s11842-006-0009-1

Jaunzeme, J. 2010. Comparison of the accounting concept „fair value" with other economic value concepts. *11th International Conference. Financial and Monetary Stability in Emerging Countries.* 291-298.

Jesemčika, J.; Jesemčika, A. 2010. Accounting of Biological Assets in Latvia. *Economic Science for Rural Development Conference Proceedings.* Issue 21: 190.-195. Retrieved from http://llufb.llu.lv/conference/economic_science_rural/2010/ESRD_2010_21.pdf

Kalniņa, G. 2014. Dzīvnieku uzskaite grāmatvedībā un atspoguļošana gada pārskatā. Bilance [Animal records in accounting and presentation in the annual report. Balance], 339-340. Retrieved from https://bilance.lid.lv/

Lefter, V.; Roman, A.G. 2007. IAS 41 Agriculture: Fair Value Accounting. *Theoretical and applied Economics* 5(510): 15-22. Retrieved from https://econpapers.repec.org/article/agrjournl/v_3a5(510)_3ay_3a2007_3ai_3a5(510)_3ap_3a15-22.htm

Mateş, D.; Grosu, V. 2009. Evaluating and recognizing biological assets and agricultural activities according to IAS 41. *Lucrări Ştiinţifice seria Agronomie* 51, vol.3: 1-6. Retrieved from http://www.revagrois.ro/PDF/2008_1_457.pdf

Ore, M. 2011. Problematic Aspects of Accounting for Biological Assets. Proceedings of the International, *Scientific Conference. Production and Taxes. Jelgava: Vidzeme University of Applied Sciences*, 204.-210. Retrieved from http://llufb.llu.lv/index_en.html

Rivža, B.; Latimira, I. 2015. Problems of recording biological assets and legislation shortcoming in Latvia, possible solutions. *Nordic view to sustainable rural development. 25th Congress.* 472.-473. Retrieved from http://llufb.llu.lv/conference/NJF/NJF_2015_Proceedings_Latvia-472-473.pdf

Riigi, T. 2011. Rtj 7 bioloogilised varad. Retrieved from https://www.riigiteataja.ee/akt/310012012005

Vooro. A. 2011. Bioloogiliste varade kajastamine raamatupidamises. Tartumaa Põllumeeste Liit. [Accounting of biological assets in accounting]. Tartumaa Farmer's Union Retrieved from http://www.rmp.ee/epood/tasutaraamatud/raamatupidamine/1018

Gada pārskata un konsolidēto gada pārskatu likuma piemērošanas noteikumi. Ministru kabineta noteikumi Nr.775. [Rules for the application of the Annual Report and the Consolidated Annual Report. Cabinet of Ministers Regulations No. 755]. 2015. Republic of Latvia Law. Retrieved from Latvian Central Statistical Bureau. Statistical Enterprise register. Economically active enterprises by main kind of activity 2013 -2016. Retrieved from http://data.csb.gov.lv/pxweb/lv/uzreg/uzreg__ikgad__01_skaits/SRG0201.px/table/tableViewLayout2/?rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0

Latvian Central Statistical Bureau. 2017. Agriculture in Latvia. Retrieved from http://www.csb.gov.lv/sites/default/files/nr_24_latvijas_lauksaimnieciba_2017_17_00_lv_en_0.pdf

Law On the Annual Financial Statements and Consolidated Financial Statements. 2015. Republic of Latvia Law. Retrieved from https://likumi.lv/ta/en/id/277779-law-on-the-annual-financial-statements-and-consolidated-financial-statements

Statistical Factsheet Lithuania. 2017. Retrieved from https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/factsheets/pdf/lt_en.pdf

Statistical country profiles Estonia. Special edition 2017. Retrieved from https://www.destatis.de/EN/Publications/Specialized/InternationalData/CountryProfiles/Estonia2017.pdf?__blob=publicationFile

Starptautisko grāmatvedības standartu padome International [Accounting Standards Board]. 2003. *41.starptautiskais grāmatvedības standarts. Lauksaimniecība:*.521.- 375. Retrieved from http://eur-lex.europa.eu/legal-content/LV/TXT/PDF/?uri=CELEX:02008R1126-20160101&from=LV

Viešosios įstaigos Lietuvos Respublikos apskaitos instituto standartų tarybos. [n.d.] 17-asis verslo apskaitos standartas „biologinis turtas" [Standards Board of the Public Institution Institute of Accounting of the Republic of Lithuania. [n.d.] Business Accounting Standard 17 "Biological Assets"]. Retrieved from: http://www.bankrotodep.lt/assets/Veiklos-sritys/Apskaita/VAS/Priimti-standartai/17-VAS-5-redakcija.pdf

Lietuvos Respublikos žemės ūkio ministerija. (2015, 27 Nov.). Dėl biologinio turto ir žemės ūkio produkcijos normatyvinių kainų 2016 metais sąrašo patvirtinimo Ministry of Agriculture of the Republic of Lithuania. (Nov. 2015). [On approval of the list of normative prices for biological assets and agricultural produce in 2016]. Retrieved from http://www.bitininkusajunga.lt/lt/Teises_aktai/Biologinio_turto_ir_zemes_ukio_produkcijos_normatyviniu_kainu_sarasas_/

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(1)

Iluta ARBIDANE is the Professor of Faculty of Economics and Management of Rezekne Academy of Technologies, Latvia. She is former Dean of Faculty of Economics, director of study programmes, Research interests: accounting and finances, human resources management.
ORCID ID: 0000-0002-9762-3874

Iveta MIETULE is the Professor of Faculty of Economics and Management of Rezekne Academy of Technologies, Latvia. She is Dean of Faculty of Economics and Management, director of study programmes, Expert of Latvian Council of Sciences. Research interests: accounting, higher education, human resources, regional development.
ORCID ID: 0000-0001-7662-9866

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

http://jssidoi.org/esc/home

AN ANALYSIS OF CROWDFUNDED PROJECTS: KPI'S TO SUCCESS

Ieva Astrauskaitė[1], Arvydas Paškevičius[2]

[1,2] Vilnius University, Saulėtekio av. 9, LT-10222 Vilnius, Lithuania

E-mails:[1] ieva.astrauskaite@evaf.vu.lt; [2] arvydas@paskevicius.com

Received 17 March 2018; accepted 10 May 2018; published 30 September 2018

Abstract. The perception of alternative finances is stimulating the global financial markets and competition between banking funding and non-banking one. In order to encourage the demand of alternative funding the overall studies and researches concentrate on different relationships of economic indicators, describing lending, savings, prosperity, GDP per capita, etc. However, there is still a lack of encouragement to the market participants to provide the market with ideas and projects, which could be crowdfunded. In order to put the efforts for the better acknowledgement and demand incentives this paper was worked up. With the aim to introduce the key performing indicators (KPI's) for successful projects, which were financed through crowdfunding platforms, the comparative analysis was made, using Pearson correlation. It has been found, that narrative of the project and visualization are among the successful factors for crowdfunding. However, the requested amount of money, location or category of the project seemed to have lesser effect to success of crowdfunding. The results of the research are adoptable for initial offerings in crowdfunding platforms, potential projects owners, as well as the further researchers developing the topic of crowdfunding. With the strong novelty and broad (regionally) sample, the research represents its value and contributes to the theoretical and empirical background of crowdfunding.

Key words: crowdfunding; key performing factors; alternative financing; correlation

Reference to this paper should be made as follows: Astrauskaitė, I.; Paškevičius, A. 2018. An analysis of crowdfunded projects: KPI's to success, *Entrepreneurship and Sustainability Issues* 6(1): 23-34. http://doi.org/10.9770/jesi.2018.6.1(2)

JEL Classifications: O16, G15, G29

1. Introduction

The perception of alternative finances is stimulating the global financial markets and competition between banking funding and non-banking one. According to ECB surveys (ECB, 2017), while business sector suffer from shortage of banking financing (27% of SME's applying for a bank loan with the rejection rate of 5%), alternative finances, such as crowdfunding, fulfill the market with finances needed.

Crowdfunding benefits are not limited to financial ones. Scholz (2015) shows that crowdfunding potentially shortens the development cycle of new products, thus enabling an earlier market entry. Hence, crowdfunding serves as a multifaceted early-stage support instrument for innovation implementation facilitated by the crowd's

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

resources. It not only provides upfront cash for product development and production, more importantly it enables a firm to show traction through the validation of the market demand that is based on the crowd's function as information multiplicator generating public exposure and feedback (Scholz, 2015).

Crowdfunding activities are still listed as developing depending on the country research is provided. However, there is enough evidence, that crowdfunding supply could enlarge the demand and whole volume of the market with further effects to substitute markets.

In order to encourage the demand of alternative funding the overall studies and researches concentrate on different relationships of economic indicators, describing lending, savings, prosperity, GDP per capita, etc.

The research community put its efforts in the analysis of success factors in crowdfunding. Cordova et al (2011) analyzed technological projects and the factors they have been financed while Koch and Siering (2016) worked on it overall, without any classification. Further researches were split into geographical locations by Beier and Wagner (2014) and Barasinska and Schlafer (2014), crowdfunding platforms by Rhue and Clark (2016), Zvilichovsky et al (2013), Kuppuswamy and Bayus (2015). The motivation and deterrents for participation were an interest of research by Gerber and Hui (2013). The two-sided approach of funders and founders win-win situations was examined by Song and Boeschoten (2015).

However, there is still a lack of encouragement to the market participants to provide the market with ideas and projects, which could be crowdfunded. In order to put the efforts for the better acknowledgement and demand incentives this paper was worked up.

The main aim is to introduce the key performing indicators (KPI's) for successful projects, which were financed through crowdfunding platforms.

The methods used. The comparative analysis was made, using Pearson correlation.

The paper is structured as follows: the motivation and relevance of the topic is revealed in introduction, when theoretical background is introduced. The second part consists of brief methodology approach and the empirical results of the research. The paper concludes with main insights and remarks on the topic.

2. Literature review

To begin with crowdfunding, an entrepreneur raises external financing from a large audience (the "crowd"), in which each individual provides a very small amount, instead of soliciting a small group of sophisticated investors (Belleflamme et al 2014). This is usually done via or with the help of the Internet (Rubinton, 2011).
There are four types of crowdfunding: donation-based, reward- based, equity-based, and lending or debt-based (Lambert and Schwienbacher, 2010; Rubinton, 2011; Buysere et al, 2012; Astrauskaite, 2017):

- **Donation**: a donor contract without existential reward. Crowdfunding is based on the fact that people want to help other people and projects they like and that are close to them, emotionally or geographically (Buysere et al, 2012).
- **Reward**: a contract with existential material reward (in money or production).
- **Lending**: a credit contract, that is being repaid plus interest.
- **Equity**: a shareholding contract, shares, equity-like instruments or revenue sharing in the project/business, potential up-side at exit.

The most popular crowdfunding sites which can be used to fund and fuel the startup, idea or project are Kickstarter, Indiegogo, Patreon, GoFundMe, Crowdrise, PledgeMusic, Razoo, RocketHub, Crowdfunder, Give, Charitable, Lending Club, AngelList, Ulule, Funding Circle, Seed&Spark, Crowdcube, GoGetFunding, Fundable, Kiva, etc. Market competition forces them to stand out, therefore some of them are more geared to developing products, others are about funding artistic endeavors, and still, others are ideally suited to nonprofits. There are

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

more distinctive features: some sites will collect all the money as it comes in, others won't collect it until the goal amount is reached.

Crowdfunding volumes differ geographically. Examining the values of funds raised through crowdfunding worldwide, it is observed an increase of 28 per cent in the year 2015 and a slight decrease of 3 per cent in the year 2016 (see Figure 1).

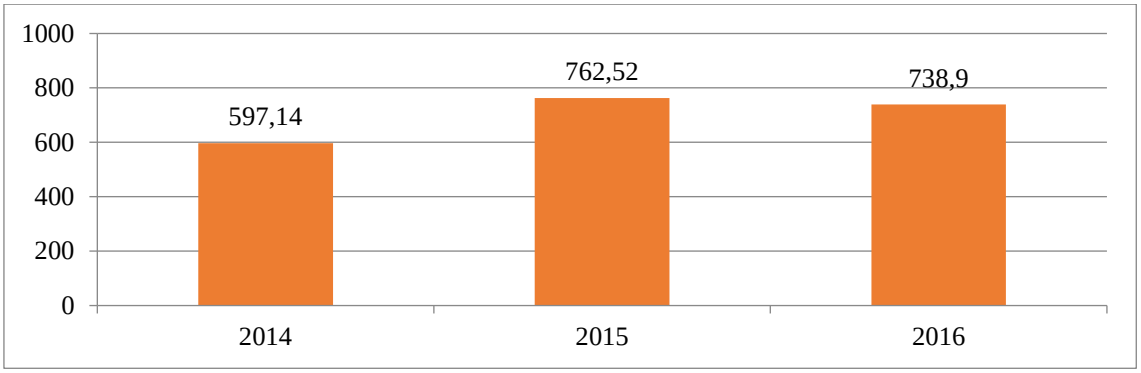


Figure 1. Value of funds raised through crowdfunding worldwide from 2014 to 2016 (in million U.S. dollars)

Source: https://www.statista.com/statistics

Top five contributing countries which are crowdfunding are United States, Canada, United Kingdom, Australia, Germany.

Turning out to the Europe, crowdfunding amounts are lesser. However, the market is driven and growth rates are measured in times: 1,3 in 2013, 1,5 in 2014, 1 in 2015 (see Figure 2).

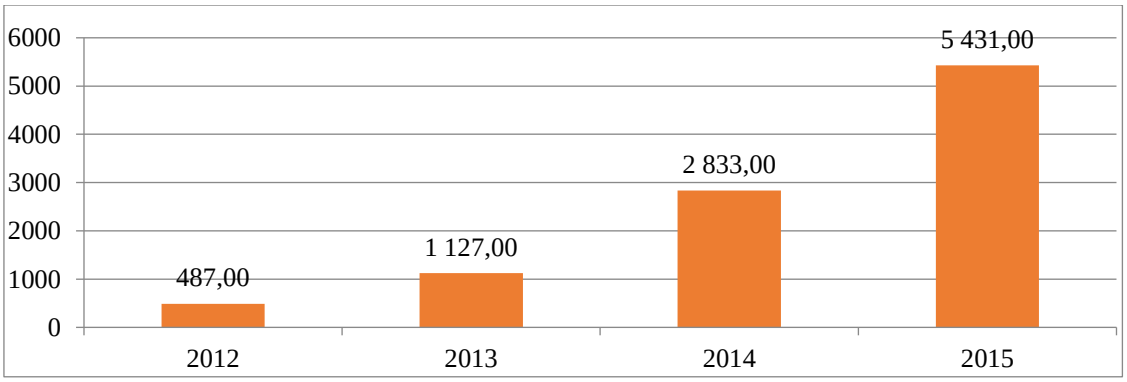


Figure 2. Alternative finance market size in Europe from 2012 to 2015 (in million euros)

Source: https://www.statista.com/statistics

Deducting the analysis to Lithuanian example, one can observe 7,8 million EUR rise on P2P consumer lending platforms in 2016. The average quarterly growth rate of the portfolio amounted to 36.4% (Lietuvos bankas, 2016). Local platforms: **Savy.lt**, a P2P consumer lending platform launched in 2014; **FinBee** an P2P consumer lending platform launched in 2015; **Paskolų Klubas** a P2P consumer lending platform launched in 2015; **Manu,** a P2P consumer lending platform launched in 2016; **Optimalus Kreditas (OK),** a P2P consumer lending platform launched in 2015Successful projects:

- PIGEON is a colorful kick scooter designed for a city "birds". 66 backers pledged 6 186 pounds to bring this project to live.
- PARKIS – effortless vertical bike parking system with 172 backers who already pledged 78 505 EUR to help bring this project to live.
- Laisves TV is creating TV shows with 4201 patrons and the monthly budget of 14 886 USD.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

These success stories encourage the discussion on crowdfunding promotion, factors influencing its development as well as on prevention of factors inhibiting it (Astrauskaite, 2017). A Key Performance Indicator is a measurable value that demonstrates how effectively a company is achieving key business objectives. This definition can be adopted to crowdfunding projects as well. The project performance indicator which demonstrates how effectively one can attract the funding is supposed as key factor for success. Definitely, the success in crowdfunding projects possess the definition of reaching the goal amount that was set in launching the project or overcoming the financial measures of the project. Many researchers were examining the factors which attract the projects to success of crowdfunding in order to state the recommendation to further demand exposure. All recent insights on the crowdfunded success were divided into three categories of project characteristics, founder characteristics and communication and sharing campaign (see Table 1).

Table 1. Key performance indicators for crowdfunding projects and their effects to success

		KPI'S		No effect
		for success	for failure	
Project characteristics	Visualization: video's, photo's, overall design	Koch J.A. and Siering M., 2015; Courtney et al, 2016; Pardo et al, 2013;	Rhue L. and Clark J., 2016;	-
	Description of the idea: story telling, smooth language, key words	Koch J.A. and Siering M., 2015; Yuan et al, 2016; Du et al, 2015; Parhankangas A. and Renko M. 2017; Allison et al, 2014;	Parhankangas A. and Renko M., 2017;Allison et al, 2014;	-
	Narrative&case: sustainable, help others, support causes, the story behind, trust, potential	Calic G. and Mosakowski E., 2016; Gerber E.M. and Hui J.,2013; Allison et al, 2014; Song Y. and Boeschoten R., 2015;	Hörisch J., 2015; Gerber E.M. and Hui J., 2013;	-
	National proximity	Beier M. and Wagner K., 2014;	-	-
	Project duration	Cordova et al, 2015; Mollick E.V. and Kuppuswamy V., 2014;	-	-
	Project financial goal	-	Cordova et al, 2015; Kuppuswamy V. and Bayus B.L., 2015; Mollick E.V. and Kuppuswamy V., 2014;	-
	Money already pledged	Cordova et al, 2015; Kuppuswamy V. and Bayus B.L., 2015; Crosetto P. and Regner T., 2014;	-	-
	Number of backers	-	Kuppuswamy V. and Bayus B.L., 2015;	-
Founder characteristics	Previous experience of founder	Courtney et al, 2016; Zvilichovsky et al, 2015;	-	Koch J.A. and Siering M., 2015;
	Gender	-	-	Barasinska N. And Schlafer D.,2014;
Communication & sharing	Third party endorsements (e.g. crowdfunding platform), comments	Calic G. and Mosakowski E., 2016; Courtney et al, 2016; Pardo et al, 2013; Josefy et al, 2016;	-	-
	Spreading it through other media channels	Courtney et al, 2016;	Beier M. and Wagner K., 2014; Mollick E.V. and Kuppuswamy V., 2014;	-
	Updates	Kuppuswamy V. and Bayus B.L., 2015;	-	-

Source: compiled by authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

Projects characteristics include all features which describes the idea, the advert and its goals. Koch and Siering (2015), Courtney et al (2016), Pardo et al (2013) examined the visualization of the advert: videos, photos, overall design and stated its influence on funding success. On the other hand, Rhue and Clark (2016) were exploring the relationship of visualizations and race and found out that projects with black fundraisers or subjects in project photos face significantly lower success rates.

The crowdfunding projects have become an object of the linguistic research therefore the description of the idea was also taken under consideration in searching the success factors to funding goals. According to Yuan et al (2016) the most influential topical features embedded in project descriptions. Koch and Siering (2015), Due et al (2015) agree on information disclosed in project descriptions is associated with funding success. Parhankangas and Renko (2017) emphasize that linguistic styles that make the campaigns and their founders more understandable and relatable to the crowd boost the success of social campaigns, but hardly matter for commercial campaigns. These insights were earlier confirmed by Allison et al (2014), stating that lenders respond positively to narratives highlighting the venture as an opportunity to help others, and less positively when the narrative is framed as a business opportunity. Allison et al (2014) and Parhankangas and Renko (2017) research results reveals the proses and coins to crowdfunding projects, while socially oriented descriptions tend to attract the success in fund raising and vice versa, commercial profiles are less successful in attracting the funds.

Narrative telling is the next characteristic which combines sustainability, help to others, support causes, the story behind, trust and potentiality. Calic and Mosakowski (2016) found out that a sustainability orientation positively affects funding success of crowdfunding projects. Gerber and Hui (2013) add supporter motivations, which include the desire to collect rewards, support causes, and be part of a community. Gerber and Hui (2013) and Allison et al (2014) agree on highlighting an opportunity to help others as the key factor to choose the object to fund. Meanwhile Song and Boeschoten (2015) found 85% of the funders are interested in the story behind a crowdfunding project. The personal interests and potential of the projects are two important factors for funders to select a crowdfunding project (Song and Boeschoten, 2015) and for the project to succeed in financing. On the other hand, Hörisch (2015) cannot observe positive connection between environmental orientation and crowdfunding success. Furthermore, Gerber and Hui (2013) finds the lack of trust in project or its implementation to be the core factor of missing the financing on crowdfunding platforms.

Moreover, this field has a great potentiality to research. Prof. Shiller in his discussion paper on narrative economics (No. 2069, 2017) emphasized that the research in economics is already on its way to finding better quantitative methods to understand the impact of narratives on the economy. Textual search is a small but expanding area in economic research. He also predicted as research methods advance, and as more social media data accumulate, textual analysis will be a stronger field in economics in coming years. It may allow us to move beyond 1930s-style models of feedback, the "multiple rounds of expenditure," and get closer to all the kinds of feedback that really drive economic events. And it will help us to better understand the kinds of deliberate manipulations and deceptions we have been suffering under, and to formulate some positive economic policies that take into account the background of narratives (Shiller, 2017).

One more project characteristic, which could lead to success in financing is described as national proximity. Beier and Wagner (2014) confirms that specific project characteristics such national proximity leverage fundraising success.

Examining the effects of project duration to funding success, Cordova et al (2015) verifies that project duration increases the chances of success. These findings fulfill the research of Mollick and Kuppuswamy (2014), who found out that projects that are better prepared in terms of business plans and schedules are more likely to gain benefits and deliver on time.

Interestingly, there is no evidence on project financial goal to reach the fund raise success. Even on the contrary an increase in the project funding goal is correlated with a lower probability and extent of success (Cordova et al, 2015). Potential backers are less likely to contribute once a project reaches its goal (Kuppuswamy V. and Bayus

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

B.L., 2015). And bigger projects are less likely to be funded (Mollick E.V. and Kuppuswamy V., 2014). Another characteristic describing the crowdfunded project is money already pledged. This amount could be seen in the

advert of the idea of the project on the internet platform. Cordova et al (2015) states that chances of success are positively related to the dollar amount contributed per day. Moreover, Kuppuswamy and Bayus (2015) found that potential backers are influenced by how much of the goal has already been pledged. The agreement is reached by Crosetto and Regner (2014), approving the concept that the increased funding towards the deadline is due to pledges to projects that already made it, particularly pre-selling pledges.

One could observe the misleading differences and similarities between the project financial goal and money already pledged to the project. To be clear enough, the pre-selling pledges term used by Crosetto and Regner (2014) and the pledges before the financial goal may lead to successful funding. While the goal reached turns the motivation on the contrary.

If the economic logic could connect the amount of money already pledged to the number of backs or supporters to the project, there is not enough scholar evidence to prove it. However, Kuppuswamy and Bayus (2015) predicate a project with a lot of backers' draws potential contributors away from other projects.

All these project characteristics studied, make an image of key factors to take the attention before launching the project on crowdfunding platform. It is important to have fear financial ambition, clear story and ability to tell narratives to attract the funders, who by making the first pledges will attract the others. Visualization also matters. Therefore any investments in marketing campaigns have enough presumptions to break-even.

The second category of key factors to success is founder characteristics. Looking more widely there is a belief that the project and its success are strongly connected to its owner. For example, Zvilichovsky et al (2015) estimates an entrepreneur's backing-history which has a significant effect on financing outcomes. Campaigns initiated by entrepreneurs who have previously supported others have higher success rates; Project owners back their backers, when possible, at a rate that is significantly higher than other comparable projects (Zvilichovsky et al, 2015). Courtney et al (2016) examines the previous experience of founder in the way of creditworthiness and says that crowdfunding experience can mitigate information asymmetry concerns about project quality and founder credibility, enhancing the project's likelihood of attaining funding.

There is lack research on personal characteristics of founder and the project launched on crowdfunding platforms. Mostly the race and gender were analyzed. As it was mentioned in the section of visualizations, the black fundraisers are less successful (Rhue L. and Clark J., 2016). However, there is no effect of gender on the individual borrower's chance to receive funds on crowdfunding platform (Barasinska N. and Schlafer D., 2014).

The amount of founder characteristics studied lets to assumption of rather unexplored field of science. There are plenty of characteristics (general and personal) which could be taken into consideration while examining the profile of founder and crowdfunding project. The only research interruptions are the data and time.

The third category of key indicators to success is communication and sharing. It is thought that broad marketing campaigns, wide sharing circles could attract more attention to the crowdfunded project as well as the backers and their funds.

Firstly, third party endorsements (e.g. crowdfunding platforms) or comments related to crowdfunding projects are being analyzed. Calic and Mosakowski (2016) partly agree on third party endorsements which positively affects funding success of crowdfunding projects. However, Courtney et al (2016) has a stronger view on third-party endorsements (sentiment expressed in backer comments) which validate and complement start-up–originated signals. Those signals enhance the project's likelihood of attaining funding. Pardo et al (2013) finds positive effects on feedback on crowdfunding projects and their financing. Furthermore, the need for further integration of community and cultural constructs into models of venture funding, as such variables may have more relevance than previously believed (Josefy et al, 2016).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

Secondly, spreading information about the idea and crowdfunding project through other media channels (than crowdfunding platform) could affect its financing. Courtney et al (2016) expands their conclusion to signals through start-up actions (use of media) which enlarge the project's likelihood of attracting funding. In contrast,

Beier and Wagner (2014) find the effects of the use of additional social media platforms and an additional homepage that are mixed. This opinion is being confirmed by Mollick and Kuppuswamy (2014) on the particular case study of Kickstarter. Some of the factors found to lead to successful fundraising (having many Facebook friends, being featured by Kickstarter), were less useful in getting long-term benefits from Kickstarter (Mollick E.V. and Kuppuswamy V., 2014).

Furthermore, the updates on the project status are supposed to be vital for the success of its funding. Kuppuswamy and Bayus (2015) confirms it with research on project support which is positively related to its updates.
All characteristics in third category were more positively than negatively related to success of funding of crowdfunding projects.

To sum up, lots of researchers are examining different factors for crowdfunding projects to success. These studies are embed into the field of behavioral and narrative economics and have huge future prospects to analyze.
To come up with the prosperous features to the projects of crowdfunding, one should determine the narratives (or the story behind), clear goal and schedule, invest into sharing and visualization, ensure support of third parties, concentrate on the process of pledging, not the financial goal and keep updating. The first attempt (and any other) seems to project the bridges for the future success.

3. Methodology

The argumentation of the research is still unchecked relations between several variables of the topic and data available.
Previous approximations to the topic were made using these methods:

- Domain-Constraint Latent Dirichlet Allocation (DC-LDA) topic model (Yuan et al, 2016), Elaboration Likelihood Model (Du et al, 2015), cognitive evaluation theory (Allison et al, 2014),
- machine learning classifiers (Pardo et al, 2013), language expectancy theory (Parhankangas A. and Renko M., 2017),
- a follow-up survey (Mollick E.V. and Kuppuswamy V., 2014), semistructured interviews (Gerber E.M. and Hui J., 2013).

As the research has a goal of relationship investigation, the data gathering methods such as surveys and the machine learning methods were rejected. The chosen method is Pearson correlation (r) with statistic significance check at p-value. This method is widely used in adoption of various listed theories to the topic (e.g. DC-LDA, Elaboration Likelihood Model, cognitive evaluation theory, etc.), therefore proven enough to be correct.
The Pearson correlation coefficient (PCC) is defined (Benesty et al, 2009) (1):

$$\rho\,(a, b) = \frac{E\,(ab)}{\sigma_a \sigma_b}\ (1),$$

where E (ab) is the cross-correlation between a and b, and σ_a^2 = E (a^2) and σ_b^2 = E (b^2) are the variances of the signals a and b, respectively.

One of the most important properties of the PCC is that $0 \leq \rho\,(a, b) \leq 1$. The PCC gives an indication on the strength of the linear relationship between the two random variables a and b. If ρ (a, b) = 0, then a and b are said to be uncorrelated. The closer the value of ρ (a, b) is to 1, the stronger the correlation between the two variables. If the two variables are independent, then ρ2 (a, b) = 0. But the converse is not true because the PCC detects only linear dependencies between the two variables a and b. For a non-linear dependency, the PCC may be equal to

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

zero. However, in the special case when a and b are jointly normal, "independent" is equivalent to "uncorrelated" (Benesty et al, 2009).

The P value, or calculated probability, is the probability of finding the observed, or more extreme, results when the null hypothesis (H0) of a study question is true – the definition of 'extreme' depends on how the hypothesis is being tested. The P value, or calculated probability, is the probability of finding the observed, or more extreme, results when the null hypothesis (H_0) of a study question is true – the definition of 'extreme' depends on how the hypothesis is being tested. If P value is less than the chosen significance level then you reject the null hypothesis

i.e. accept that the sample gives reasonable evidence to support the alternative hypothesis (Benesty et al, 2009). The authors of this paper refer to statistically significant as $P < 0.05$.

The main aim of the research is to determine the geographic location, categorization of the project and reward given relationship with crowdfunding pledged. Variables were chosen according to the existing shortage of the empirical evidence on the relationship between them.

Data set & period. Data on projects were gathered by Random Walk theory on Kickstarter.com platform from 2014. Sample size consists of 36 projects.

Variables: percentage already pledged (%), location of the project (North America, Asia, Europe), category of the project (technology, entertainment, craft, fashion), the minimum pledge for a reward ($).

The Pearson correlations coefficients were calculated between variables using Microsoft Excel toolkit. All coefficients were validated by p-value check. Conclusions were made.

4. Empirical results

According to the methodology, the crowdfunding projects success indicators' correlations were formed as follows (see Table 2).

Table 2. Relationship between crowdfunding projects success factors

	Pledged, %	**Category**	**Location**	**Reward**
Pledged, %	1	-	-	-
Category	0,10326579 (0,55)	1	-	-
Location	-0,0716797 (0,68)	0	1	-
Reward	-0,1391097 (0,42)	-0,3310297	0,1619022	1

Source: compiled by authors

There could be found:

- a very small positive correlation (r=0,1) between percentage already pledged and category of the project; according to given values to categories it could be concluded that fashion projects are more successful in the terms of funding;
- meaningless negative correlation (r=-0,07) between percentage already pledged and location of the founder; to sum up, Asian projects attract higher percentage of investment;

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

- slightly negative correlation (r=-0,14) between percentage already pledged and the minimum pledge for a reward; hence, lesser reward, higher funds are raised.

It should be noted that these abbreviations are distant approximations to samples means according to statistically insignificant measures (all variables possess p value greater than 0,05 significance level).

These results could fulfill Table 1 as follows (see Table 3)

Table 3. Additional key performance indicators for crowdfunding projects and their effects to success

		KPI'S		No effect
		for success	for failure	
Project characteristics	Location (North America, Asia, Europe)	-	-	Astrauskaite and Paskevicius, 2018;
	Category (technology, entertainment, craft, fashion)	-	-	Astrauskaite and Paskevicius, 2018;
	The minimum pledge for a reward ($)	-	-	Astrauskaite and Paskevicius, 2018;

Source: compiled by authors

To sum up, location of the project (North America, Asia, Europe), category of the project (technology, entertainment, craft, fashion), the minimum pledge for a reward ($) have no significant effect on percentage already pledged (%).

5. Conclusions

According to the results of the research the following conclusions could be made:

- The narratives (or the story behind), clear goal and schedule of the project lead to its **crowdfunding** success.
- Investments into communication schemes and visualizations of adverts as well as the support of third parties, maximize the likelihood of fund raising success.
- Concentration on the process of pledging, not the financial goal, ensures better funding opportunities to **crowdfunded** projects.
- Splitting **crowdfunding** into categories is structured, however, with no validated input to financial outcomes.
- **Crowdfunding** is not attached to any location.
- **Crowdfunding** is more about narratives, personal impact, funder feelings, but not reward.
- Asian founders succeed in fashion lowers community.

Recommendations

The findings and conclusions of the study promotes these proposals:

- To enlarge sample size for more decent results of the research.
- Add more categories and or regions to variables.
- Add more independent variables to peer correlations.
- Chose different methods, e.g. the Granger causality test.

References

Allison T. H., Davis B.C., Short J.C., Webb J.W. (2014). Crowdfunding in a Prosocial Micro-lending Environment: Examining the Role of Intrinsic Versus Extrinsic Cues [online], Available at: http://onlinelibrary.wiley.com/doi/10.1111/etap.12108/full [Accessed 1 February 2018].

Astrauskaitė I. (2017). Economics of Crowdfunding by What-If Analysis Approach. *Advances in Economics, Business and Management Research* [online] Volume 37, p. 945-960. Available at: https://www.atlantis-press.com/proceedings/ictim-17/25885111 [Accessed 8 November 2017].

Barasinska N. And Schlafer D. (2014). Is Crowdfunding Different? Evidence on the Relation between Gender and Funding Success from a German Peer-to-Peer Lending Platform [online], Available at: http://onlinelibrary.wiley.com/doi/10.1111/geer.12052/full [Accessed 1 February 2018].

Beier M. and Wagner K. (2014). Crowdfunding Success of Tourism Projects - Evidence from Switzerland. [online], Available at: https://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2520925 [Accessed 2 February 2018].

Belleflamme, P., Lambert, T., Schwienbacher, A. (2010) "Crowdfunding: An Industrial Organization Perspective", [Online], Available: https://economix.fr/pdf/workshops/2010_dbm/Belleflamme_al.pdf [Accessed 2 February 2018].

Belleflamme, P., Lambert, T., Schwienbacher, A. (2014) "Crowdfunding: Tapping the right crowd", Journal of Business Venturing, vol. 29, no. 5, pp. 585–609.

Benesty J., Chen J., Huang Y., Cohen I. (2009) Pearson Correlation Coefficient. In: Noise Reduction in Speech Processing. Springer Topics in Signal Processing, vol 2. Springer, Berlin, Heidelberg, pp. 37-40.

Buysere, K.D., Gajda, O., Kleverlaan, R., Marom, D. (2012) "A Framework for European Crowdfunding, 1st ed.", [Online], Available from Internet: http://www.infoeuropa.ciejd.pt/files/database/000051001-000052000/000051102.pdf [Accessed 2 February 2018].

Calic G. and Mosakowski E. (2016). Kicking Off Social Entrepreneurship: How A Sustainability Orientation Influences Crowdfunding Success. *Sustainability, Ethics and Entrepreneurship*, 53(5), pp. 738-767.

Cordova A., Dolci J., Gianfrate G. (2015). The Determinants of Crowdfunding Success: Evidence from Technology Projects. *Procedia - Social and Behavioral Sciences*, 181, pp. 115-124.

Courtney C., Dutta S. adn Li Y. (2016). Resolving Information Asymmetry: Signaling, Endorsement, and Crowdfunding Success. *Entrepreneurship theory and practice*, 41(2), pp. 265-290.

Crosetto P. and Regner T. (2014). Crowdfunding: Determinants of success and funding Dynamics. Jena Economic Research Papers, [online], Available at: https://www.econstor.eu/handle/10419/108542 [Accessed 1 February 2018].

Cumming D.J., Leboeuf G., Schwienbacher A. (2015). Crowdfunding Models: Keep-It-All vs. All-Or-Nothing. [online], Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2447567 [Accessed 1 February 2018].

Du Q., Fan W., Qiao Z., Wang G. (2015). Money Talks: A Predictive Model on Crowdfunding Success Using Project Description. *Business Analytics, Big Data and Knowledge Management (SIGDSA)*, [online] Volume 37, Available at: http://aisel.aisnet.org/amcis2015/BizAnalytics/GeneralPresentations/37/ [Accessed 2 February 2018].

ECB (2017). Survey on the access to finance of enterprises [Online], Available: https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/index.en.html [cited 30 December 2017].

Gerber E.M. and Hui J. (2013). Crowdfunding: Motivations and deterrents for participation [online], Available at: https://dl.acm.org/citation.cfm?id=2530540 [Accessed 1 February 2018].

Hörisch J. (2015). Crowdfunding for environmental ventures: an empirical analysis of the influence of environmental orientation on the success of crowdfunding initiatives. *Journal of Cleaner Production*, 107, pp. 636-645.

Josefy M., Dean T., Albert L. S. and Fitza M. A. (2016). The Role of Community in Crowdfunding Success: Evidence on Cultural Attributes in Funding Campaigns to "Save the Local Theater" [online], Available at: http://onlinelibrary.wiley.com/doi/10.1111/etap.12263/full [Accessed 2 February 2018].

Koch J.A. and Siering M. (2016). Crowdfunding Success Factors: The Characteristics of Successfully Funded Projects on Crowdfunding Platforms. *Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)* [online], Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2808424 [Accessed 2 February 2018].

Kuppuswamy V. and Bayus B.L. (2015). Crowdfunding Creative Ideas: The Dynamics of Project Backers in Kickstarter. [online], Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2234765 [Accessed 1 February 2018].

Lietuvos bankas (2017). Vartojimo kredito rinkos apžvalga. [online] Available at: http://www.lb.lt/lt/leidiniai/vartojimo-kredito-rinkos-apzvalga-2016 [Accessed 1 February 2018].

Mollick E.V. and Kuppuswamy V. (2014). After the Campaign: Outcomes of Crowdfunding [online], Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2376997 [Accessed 1 February 2018].

Pardo B., Greenberg M. D., Harihan K., Gerber E. (2013). Crowdfunding support tools: predicting success & failure. Proceeding CHI EA '13 CHI '13 Extended Abstracts on Human Factors in Computing Systems [online], Available at: https://dl.acm.org/citation.cfm?id=2468682 [Accessed 2 February 2018].

Parhankangas A. and Renko M. (2017). Linguistic style and crowdfunding success among social and commercial entrepreneurs. Journal of Business Venturing, 32(2), pp. 215-236.

Rhue L. and Clark J. (2016). Who Gets Started on Kickstarter? Racial Disparities in Crowdfunding Success. [online], Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2837042 [Accessed 2 February 2018].

Rubinton, B.J. (2011) "Crowdfunding: Disintermediated Investment Banking", [Online],. Available: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1807204 [Accessed 2 February 2018]

Scholz N. (2015). *The Relevance of Crowdfunding*. Springer Fachmedien Wiesbaden.

Shiller R.J. Narrative economics. [online] Available at: https://cowles.yale.edu/sites/default/files/files/pub/d20/d2069.pdf [Accessed 17 March 2018].

Song Y. and Boeschoten R. (2015). Success factors for Crowdfunding founders and funders. [online], Available at: https://arxiv.org/abs/1503.00288 [Accessed 1 February 2018].

Statistics on crowdfunding (2018). [Online], Available: https://www.statista.com/statistics [Accessed 1 February 2018].

Yuan H., Lau R. Y.K. and Xu W. (2016). The determinants of crowdfunding success: A semantic text analytics approach. Decision Support Systems, 91, pp. 67-76.

Zvilichovsky D., Inbar Y. and Barzilay Ohad (2015). Playing Both Sides of the Market: Success and Reciprocity on Crowdfunding Platforms [online], Available at: https://ssrn.com/abstract=2304101 [Accessed 2 February 2018].

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(2)

Ieva ASTRAUSKAITĖ, PhD is the assistant professor of Vilnius University, Faculty of Economics and Business Administration, Finance Department. Research interests: capital market, corporate finance, taxation, fin-technologies.
ORCID ID: orcid.org/0000-0002-7901-6173

Arvydas PAŠKEVIČIUS, PhD is the Professor of Vilnius University, Faculty of Economics and Business Administration, Head of Finance Department. Research interests: investments, capital markets development problems, foreign Exchange, business valuation.
ORCID ID

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

MEASUREMENT OF INFORMATION IN THE SUBSYSTEM OF INTERNAL CONTROL OF THE CONTROLLING SYSTEM OF ORGANIZATIONS OF THE AGRO-INDUSTRIAL COMPLEX *

Svetlana Bychkova[1], Nadezhda Makarova[2], Elena Zhidkova[3]

[1]Saint-Petersburg state agricultural University, St. Petersburg, Pushkin, Petersburg Highway 2, 196601, Russia

[2]Volgograd Cooperative Institute (branch) of the Russian University of Cooperation, Volgograd, Novosibirskaya street, 76, 400002, Russia
[3]Kemerovo State University, Kemerovo, Krasnaya Street, 6, 650000, Russia

E-mails: [1]smbychkova@mail.ru; [2]yamg@mail.ru; [3]291154@mail.ru

Received: 8 March 2018; accepted 8 May 2018; published 30 September 2018

Abstract. In accordance with the new management concept, based on some provisions of the system paradigm, the process subsystem of internal control of the controlling system of organizations of the agro-industrial complex is considered. The process system of internal control of agro-industrial complex organizations is primarily connected with the control of certain information systems that accumulate information on quantitative and qualitative indicators, taking into account the internal and external conditions of functioning of agro-industrial complex organizations, as well as management systems. The article describes the levels of information measurement in the process system of internal control: a syntactic level that does not express a semantic relation to the object; semantic level, which determines the semantic content of information; a pragmatic level that reflects the value, usefulness of using information. The research purpose was to formulate a conclusion that in the process system of internal control of the agro-industrial complex organizations, large amounts of information are needed to inform controlling information in order to obtain the opportunity to make effective decisions to eliminate deviations, thereby increasing the efficiency of business development of agro-industrial organizations.

Keywords: process system of internal control, controlling system, information, syntactic approach, semantic approach, pragmatic approach, business analytics, entropy.

Reference to this paper should be made as follows: Bychkova, S.; Makarova, N.; Zhidkova, E. 2018. Measurement of information in the subsystem of internal control of the controlling system of organizations of the agro-industrial complex, *Entrepreneurship and Sustainability Issues* 6(1): 35-43. http://doi.org/10.9770/jesi.2018.6.1(3)

JEL Classifications: D80, G 32, M 11, Q14, Q13

* *The study was carried out with the financial support of the Russian Foundation for Basic Research within the framework of the scientific project 18-010-01096 «Neo-system approach as a factor of scientific justification of transformation of the fundamentals of controlling of agribusiness organizations».*

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

1. Introduction

The modern systemic minieconomics (economy of an economic entity), which is based on the provisions of the systemic paradigm, raises the question of the boundaries of systems that operate in an economic entity, and, as a consequence, the nature of the interactions of the internal institutional structure with the environment and, first of all, with information.

Today the structural organization of the agro-industrial complex (further – AIC) is represented by agricultural firms, agricultural factories, agricultural holdings and financial-industrial groups, which are based on the principles of horizontal and vertical integration. The most advanced management mechanism, such as the controlling system, including the subsystems of planning, accounting, control and analysis, is necessary for the effective operation of such organizations (Golovina, Golovin 2013; Golovina 2013). Many AIC organizations face an agency problem (agency problem) caused by information asymmetries and contract incompleteness. The agency problem in corporate governance becomes a source of risks of managerial opportunism of managers, which can lead to losses, damage the reputation of the AIC organization and reduce its value. With regard to organizational and managerial innovation, the ideas and experience of Western companies in the organization of the controlling system can be useful (Paseková et al. 2018, Ryabchenko et al. 2017; Svetlanská et al. 2018, Mokhova et al. 2018). The presence of an effective controlling system in an economic entity, one of the structural components of which is internal control, is considered a positive signal for partners and potential investors, which will best affect the growth of the company's capitalization and optimization of agency value.

The research purpose is to evaluate the measurement of information in the subsystem of internal control of the controlling system of organizations of the agro-industrial complex. In order to formulate a conclusion that in the process system of internal control of the agro-industrial complex organizations, large amounts of information are needed to inform controlling information in order to obtain the opportunity to make effective decisions to eliminate deviations, thereby increasing the efficiency of business development of agro-industrial organizations. Inductive and deductive, information's systematisation, comparison and summary methods were used for the research.

2. Subsystem of control in the controlling system from the position of system economic theory

The institutional subsystem "internal control", which has its own routines, is just one of the process subsystems of controlling, which is part of its complex design. The reference of internal control to the process subsystem of the controlling system is carried out depending on the belonging to the space-time characteristics: uncertainty in space; certainty in time. Each of the controlling subsystems can also be structured into separate units with certain types of systems. In this case, the internal control subsystem in the controlling system should be considered as an independent system (in our case, as an internal control system) with appropriate structuring of the main control components.

With regard to the context of this article, it is proposed to define internal control as a technological infrastructure that provides the organization and implementation of the process aimed at preventing errors and distortions of information for the effective conduct of activities and achievement of the goals. The process subsystem of internal control of the controlling system provides a balance in the spatial sense, completes the management cycle and acts as its result, using the results of accounting and analysis, assesses the adequacy of the implementation of the management decision, which resulted in a new management decision. In this regard, internal control becomes particularly important, since the quality of the generatedinformation does not always meet the needs of the business and management in AIC organizations.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

The process subsystem of internal control of the AIC organizations controlling system is connected, first of all, with the control of certain information systems, which store and accumulate information on quantitative and qualitative indicators, taking into account the internal and external conditions of functioning of the AIC organizations, as well as management systems. Consequently, the system of internal control is a qualitative side of controlling.

"Object" in the context of internal control is understood to mean the controlled link of the controlling system, which receives the control action. Depending on the system parameters (space constraints, time constraints), objects and their groups are combined in the course of systematic control in the object subsystem.

One of the most important attributes of the control system is the scale of control, which determines the ability of the system elements to receive and process information, solve more tasks and change strategies.

The solution of problems of complicationsin administrative tasks of strategic, tactical and operational levels on increasing volumes of information is assigned to the process subsystem of internal control of system of controlling. Under the information the authors understand "the object of perception, conversion, transmission and storage of a certain amount of information expressed by the signals, signs, messages, news, to eliminate uncertainty or to expand concepts about the world" (Shokhnekh, Makarova 2012, p. 146).

3. Measurement of information in the process subsystem of internal control of the controlling system of agribusiness organizations

The system of internal control in general in the beginning will be an information support of control activities of the organization AIC, which passes through the implementation of control functions (impact on each input at the appropriate time to achieve the desired output), and the output - information about the level of control of the object subsystem control.

The generated controlling information in the internal control system necessary for the management of the AIC organizations should be classified into two blocks: in relation to the controlled object (objects identified in the object subsystem of the internal control system; the type of communication of the object of control with the external environment; in relation to the target function of the object of control, logical content) and in relation to information technology, that is, to the processes of its collection, processing and provision (on the boundaries of fixation, the levels of additional processing before provision, universality, complexity, capacity, organization (ordering), the form of representation and the method of obtaining, the procedure of transformation, the degree of transformation).

Processing of information in the internal control system of AIC organizations should be considered from two positions: 1) the use of modern technologies and technical means in the work with the information under review; 2) identification and evaluation of objectively adequate volumes and flows of information.
Evaluation of information in the system of internal control can be carried out using the syntactic, semantic, pragmatic levels of information and using parameters such as the amount of information, the amount of data, the quality of information.

In view of the fact that the AIC organization, being the link of economic systems, operates in conditions of non-linear development, internal control may face such a phenomenon as entropy of information.
From the position of the syntax level, the entropy method is used to measure the amount of information.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

The measure of chaos is associated withthe concept of entropy. In 1872, the Austrian physicist L. Boltzmann prudently identified entropy as a measure of chaos on the one hand with entropy as a measure of the missing information about the state of the system on the other. In the future, Shannon K. from different initial positions came to the same conclusion.

The first works on the theory of information is considered to be R. Hartley's articles (Hartley 1928), which first proposed a logarithmic measure of information (Hartley's amount of information) for equally probable events, as well as K. Shannon's publications (Shannon 1948), which determined the same for sets of events with different probabilities. On this basis, considering such properties of information as a novelty,would be surprise.
The most general definition of the amount of information in the probabilistic sense is described in the works of An. Kolmogorov (mid 50-ies of the last century). His work reflected an understanding of the universality of entropy as a measure of chaos regardless of nature. In addition, he developed another approach - the so-called algorithmic information theory, where entropy was understood as the complexity of the object, equal to the complexity of the algorithm describing the object (Kolmogorov 1987).

The relationship between entropy and information is reflected in the formula:
$H + I = 1$,
where h is the entropy, I – information. This conclusion was quantified by the French physicist Leon Brillouin, who introduced the value of inverse entropy-negentropy, defined as entropy, taken with the opposite sign.

It should be noted that there is a relationship between information entropy and entropy thermodynamic, but it also denies their equivalence and identity. If earlier the concept of entropy was used only for systems seeking to thermodynamic equilibrium (to the maximum disorder in the motion of its components, to increase entropy), the concept of information drew attention to those systems that do not increase entropy, but on the contrary, being in a state with small values of entropy, strive for its further reduction (Bekman 2009).

It is the information in the object subsystem of the internal control system of AIC organizations that becomes a source of entropy, which is also an indicator of increasing deviations.

Large values of entropy are typical for a low-organized system (a system with a high disorder and chaos). Low entropy values are inherent in high structural ordering of a particular system. Thus, entropy serves as a measure of structural organization of the system. In the internal control system, self-organization occurs as a result of the emergence of local ordering of information. To make the right decision, you should have a certain amount of information to avoid overloading managers and specialists.

The semantic approach to information evaluation is used to determine the content side (subject value) of the received information. The logical-semantic theory of information was developed for the first time by W. Bar-Hillel and R. Carnap. Based on the works of these authors K. E. Voishvillo (1966) subsequently combined information not directly from experience but from some judgments in which the entropy can be interpreted as the measure of accumulation of information. The measure of information depends on the surprise factor.

Russian scientist Yu. A. Schreider presented the semantic aspect of measuring the semantic content of information in a different way. He suggested using the thesaurus measure (Shreider 1971). Ideas about the thesaurus method were previously proposed by the founder of Cybernetics N. Wiener. In information theory, a thesaurus is a collection of information that a subject has. J. A. Schrader mapped out the representation of diversity, in which quantified semantic information is assessed through the level change of the thesaurus, i.e. through changes of the diversity of knowledge of the subject.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

Depending on the relationship between the semantic content of the information and the user's thesaurus, the amount of semantic information changes, while the nature of such dependence is reduced to the consideration of three main conditions under which the user's thesaurus (Yashin 2008):
* tends to zero (that is, the user does not perceive, does not understand the information received);
* tends to infinity (i.e. the user thoroughly knows all about the object or phenomenon and received information it is not interested);
* agreed with the semantic content of the information (that is, the received information is clear to the user and carries new information).

The first two limit conditions characterize the state in which the user receives the minimum amount of information. The third means that the user obtained the maximum amount of semantic information. Therefore, "the amount of semantic information that is obtained is a relative value, because the same message can have meaning for a competent user and be meaningless for an incompetent user" (Yashin 2008, p. 11).
Semantic (semantic) alignment in the process subsystem of internal control of the controlling system is to prevent short-term and, most often, non-recurring distortions that could lead to a misalignment of forms of registration of accounting events with essential features of management.

At the pragmatic level, as an alternative to the semantic level, the amount of information is perceived from the point of view of achieving the goal set by the recipient (the usefulness of the message is evaluated). This aspect allows you otherwise, take into account such characteristics of information as value, usefulness, relevance, reliability, adequacy, and others, with a focus on identifying bottlenecks related to the process of communication in a different way.

The works of the academician A. A. Kharkevich within the framework of the mathematical theory of information should be highlighted. A. A. Kharkevich was one of the first researchers to study the problem of assessing information at a pragmatic level, proposing in his article a method for determining the measure of the value of information through the increment of the probability of achieving the goal when it is obtained (Kharkevich 1960). Thus, a pragmatic measure characterizes the value of information to the achievement of the objective of the office. M. M. Bongard approached the problem of the value of informationfrom a different position. He introduced the concept of "useful information", in which the message is associated the task that the recipient is solving what the recipient decides, and that he knows before the arrival of the message, as it interprets (Bongard 1967). This position has a probabilistic-algebraic essence, which makes it more general than A. Kharkevich's approach.

Of particular interest within the framework of pragmatic information theory is the behavioral model of communication by Akoff-Miles, which is based on the concept of "goal-oriented state", which allows to increase the probability of choosing the most effective option from the available alternatives to the best strategy to achieve the goal (Akoff, 1985). However, a weakness of the model is its lack of preparedness for the assessment of false reports.

The pragmatic properties of information are expressed only in the fact of the unity of information (object), user (subject) and the purpose of internal control. From the point of view of consideration of the pragmatic aspect, the emphasis is placed on the evaluation of the usefulness of information (content) in the development of consumer targeted solutions. This form of conformity directly relates to the practical use of information, the consistency of its target function of the system.

In the internal control system of AIC organizations the pragmatic level in the evaluation of economic information is the most important, because in determining the value of information guided by such criteria as usefulness. The

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

usefulness of the information is that for making effective decisions under risk should use the information that is really necessary.

Table 1 presents the characteristics of the information levels in the process subsystem of internal control of the system controlling AIC organizations.

Table 1. Characteristics of measurement levels of information in the process subsystem of internal control of the system controlling organizations AIC

The name of the levels	Characteristics of the level		
	Measurement	Amount of information	Obtaining information
Syntax level (does not Express a semantic relation to the object)	The amount of Vd data in a message is measured by the number of characters in that message. Units of the number system (often binary) - bits or bytes and their derivatives	Is determined by the uncertainty in the system (entropy). The amount of information is measured by reducing the uncertainty of the system state	The choice of one message from a finite, predefined set of N is equal to the number of equally probable messages. $I = \log_2 N$
Semantic level (the semantic content of information)	The amount of Vd data in the semantic sense (depends on the information and the amount of knowledge necessary for its perception)	The amount of information Ic=f(Sp), Sp – thesaurus user, Ic – information perceived by the user	Accept the message can be of high value to one subject and be a meaningless character set to another
Pragmatic level (value, usefulness of using information)	Accept the message can be of high value to one subject and be a meaningless character set to another	Amount of information IP= log R1/r0 where P0 is the probability of reaching the goal before receiving the message; P1-probability of achieving the goal after receiving the information	The resulting information may not change the probability of achieving the goals: P1= P0, and then Ic= 0, and the information is called empty. The information obtained can increase the probability of achieving the goal, i.e. P1>P0, and, therefore, the quantitative measure of the value of information (pragmatic information) Ic = log P1 / P0>0, i.e. it is positive. In the case where the probability of achieving the goals decades and P1 < P0, Ic = log P1 / P0 < 0, such information will have a negative sign and be perceived as disinformation

On the syntactic level one should take into account the media type and method of displaying information, the transfer speed and processing, the symbols (code system) to represent information. However, the syntactic measure of information in the process subsystem of internal control system controlling agribusiness organizations is relative. The indicator of the syntactic measure of information is not so much its total volume as the property to reduce the uncertainty of knowledge about any system, object or phenomenon.

In general, the process of informatization in the process subsystem of internal control system controlling AIC organizations will be as follows:

$$Iß = H(\alpha) - Hß(\alpha),$$

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

where H (α) is the initial information about the system (situations, risks, etc.),
Hβ(α) is the ultimate information,
Iß- is the amount of information received (syntax measure of information).

If the internal control system recognizes the object subsystem of research (production, centers of economic responsibility, situation, risks, etc.), then the entropy is removed, then Hß(α) turns into 0, and accordingly Iß becomes equal to H(α), that is, in this case, the information system starts with "0". This fact is taken into account when making a decision. The syntax approach uses the term "data", and the amount of data is related to the number of instances of documents, the number of records in the database, and so on.

The semantic measure indicates the property of the user to assimilate the received information. In the present case, such a user is the controller. This circumstance directly involves a set of information (knowledge) about any object or event available to the controller (user) or the system as a whole.
To obtain an objective assessment of the amount of information at the semantic level, thecontent coefficient is used.

The volume of information received by the controller represents a relative value. It is more due to their level of fitness (competence) to perform the reception of messages or data. To carry out an objective assessment of the amount of information at the semantic level, the content coefficient C is used, which is determined by the following formula:

$$C = Ic / Vd$$

Where
Ic- is the amount of semantic information,
Vd- is the total amount of information.

A pragmatic measure of information determines its usefulness, and the value for the system of internal control. This measure is primarily determined by the value of the price of information in each case.

It should be noted that in assessing the amount of information from the point of view of semantic and pragmatic levels, it is necessary to take into account the temporary dependence of information, since in the internal control system it has the feature of aging (losing value). Therefore, it is especially important to use the information at the moment of greatest value. In the system of internal control, first of all, it is necessary to achieve an increase in the accuracy of the analyzed, evaluated and predicted information in aggregate. In the controlling system, with the correct use of information, the AIC organization can provide its competitive advantages and in the future increase its value.

The modern AIC organization pursuing the purpose-increase of efficiency of activity, is inconceivable without the optimum system of controlling based on use of new information technologies and the latest computing equipment. Processing of data related to internal control is one of the main actions taken over the information, and it is carried out with the help of business intelligence tools. In today's world, the conventional reduction "BI" is generally accepted, which means only the part of business intelligence that provides the development and use of business information analysis technologies.

Business Analytics is a real subject technology of extracting semantic and pragmatic meaning of information.
At the time of receipt of information from various sources of information a syntax and semantic data harmonizationis carried out, automatically identifying syntax errors and incompatibility formats, as well as their correction and formatting. Syntax differences (different encoding of the same file attributes, different variants of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(3)

names for this set of attributes with identical values, or the same names for attributes with different values) are subject to unification or differentiation according to certain rules of the subject area of ranking.

Semantic errors (such as missing data values in an unknown format or semantic errors in live source data) are identified and documented using domain validation criteria. Further, semantic harmonization of the data collected in accordance with production and economic, subject and time requirements is carried out.

In a pragmatic sense, at the entrance of the internal control system, only those that are necessary and sufficient to display a reliable picture of the state of agricultural business at a certain point of time are selected from the totality of the observed indicators.

The reliability of the information is supported by the relevant organization of the information system aimed at reducing the transaction information flows.

The use of information systems of class BI (Business Intelligence) or innovative cognitive service Watson Analytics as a tool of internal control APK provides a solution to key tasks: the organization of information and analytical support for the objective study of the activities of the cyclical nature of agricultural production; identify negative factors with the aim of maintaining economic security and improving the efficiency of management in agribusiness companies.

Conclusions

Under research results it may be concluded, that meta-controlling, which includes a process system of internal control as an integral part, acting in the framework of a unified information space of the organization of agriculture. The process subsystem of internal control of the controlling system penetrates the information space in almost real time and acts on the controlling system, adjusting it to the changing conditions of activity in the rapid receipt of information.

References

Akoff, R. 1985. *Planning for the future of the corporation.* Moscow: Published by Progress.

Bekman, I. N. 2009. *Informatics: a course of lectures.* Moscow-Rome: Published by MSU. Retrieved from http://profbeckman.narod.ru/InformLekc.htm

Bongard, M. M. 1967. *The Problem of Recognition.* Moscow: Published by Nauka.

Golovina, T. A. 2013. Concept Application «Management Future» for Forecasting of Financial Results Industrial Enterprises, *Contemporary Economic Issues* 1. http://doi.org/10.24194/11304

Golovina, T. A., Golovin, R. A. 2013. Organization of System of Administrative Strategic Control of Expenses for Production and Realization of Production of the Industrial Enterprise, *Contemporary Economic Issues* 2. http://doi.org/10.24194/21304

Hartley, R.V. L. 1928. Transmission of Information, *Bell System Technical Journal* 7(3): 535-563.

Kharkevich, A. A. 1960. On the Value of Information, *Problems of Cybernetics* 4: 53-57.

Kolmogorov, A. N. 1987. *Theory of Information and Theory of Algorithms.* Moscow: Published by Nauka.

Mokhova, N.; Zinecker, M.; Meluzín, T. 2018. Internal factors influencing the cost of equity capital, *Entrepreneurship and Sustainability Issues* 5(4): 827-845. http://doi.org/10.9770/jesi.2018.5.4(9)

Paseková, M.; Müllerová, L.; Crhová, Z.; Svitaková, B. 2018. Impact of reporting of deferred tax on sustainable development of a counry: case of Czech Republic, *Journal of Security and Sustainability Issues* 7(4): 769-779. https://doi.org/10.9770/jssi.2018.7.4(13)

Ryabchenko, O.; Golub, G.; Turčeková, N.; Adamičková, I.; Zapototskyi, S. 2017. Sustainable business modeling of circular agriculture production: case study of circular bioeconomy, *Journal of Security and Sustainability Issues* 7(2): 301-309. https://doi.org/10.9770/jssi.2017.7.2(10)

Shannon, C. E. 1948. A Mathematical Theory of Communication, *Bell System Technical Journal* 27: 379-423.

Shokhnekh, A. V., Makarova, N. N. 2012. Theory and methodology of the formation of control analytical procedures for assessing the development and application of information technologies, *Bulletin of International Academy of Agrarian Education* 2(15): 145-156.

Shreider, Yu. A. 1971. Thesaurus in Informatics and Theoretical Semantics, *Information languages. STI. Ser. 2* 3: 21-24.
Svetlanská, T.; Turčeková, N.; Adamičková, I.; Skalský, R. 2017. Food security facets: case of Slovakia regions, *Journal of Security and Sustainability Issues* 7(2): 311-320. https://doi.org/10.9770/jssi.2017.7.2(11)

Voishvillo, K. E. 1966. *An attempt at a semantic interpretation of statistical concepts of information and entropy.* Moscow: Published by Mysl.

Yashin, V. N. 2008. *Informatics: personal computer hardware.* Moscow: Published by Infra-M.

Svetlana Mikhailovna BYCHKOVA is Doctor of Economic Sciences, Professor, Head of the Department of Accounting and Audit, St. Petersburg State Agrarian University, St. Petersburg, Russia. Research interests: audit methodology, controlling.
ORCID ID: orcid.org/0000-0001-7684-9025

Nadezhda Nikolaevna MAKAROVA is Doctor of Economic Sciences, Associate Professor, Professor of the Department of Economic Security and Information Technologies, Volgograd Cooperative Institute (Branch) of the Russian University of Cooperation, Volgograd, Russia. Research interests: system analysis, controlling, economic safety.
ORCID ID: orcid.org/0000-0001-9305-0477

Elena Anatolyevna ZHIDKOVA is Candidate of Economic Sciences, Associate Professor, Head of the Department Accounting, Analysis, Audit and Taxation, Kemerovo, Russia. Research interests: controlling, entrepreneurial structures of agro-industrial complex.
ORCID ID: orcid.org/0000-0002-7658-0254

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

BEHAVIOR OF THE LITHUANIAN INVESTORS AT THE PERIOD OF ECONOMIC GROWTH

Egidijus Bikas[1], Vitalija Saponaitė[2]

[1,2] *Vilnius University, Faculty of Economics and Business administration, Sauletekio 9 LT-10223, Vilnius, Lithuania*

E-mails: [1]egidijusvln@gmail.com , [2]v.saponn@gmail.com

Received 19 March 2018; accepted 5 May 2018; published 30 September 2018

Abstract. Modern scientists speak and write about investor's psychological factors, decision-making processes, and the importance of financial behavior in the investment process. One of the modern theories – an efficient market – focused on rational investors. According to it, investors rationally manage their investment portfolio; rationally respond to constantly changing information and make rational changes to newly acquired information. However, the prospect theory has proven that irrational investor decisions play an important role in the investment process. An assessment of irrationality of investors is important for governments, fund managers and investors, eventually for all participants of financial market. For some, this is an opportunity to additional funds, to receive higher income, for others, would provide the added value, as they could identify themselves as investors. Understanding how decisions are influenced by behavior it is important both for self-education and investment decision-making. The article aims to identify the typology of the Lithuanian investors by distinguishing behavioral deviations that influence the behavior of investors' decisions in the stage of the country's economic growth. The research will identify types of physical entities, behavioral deviations, motives of investment decisions made. The qualitative and quantitative methods are used to perform the research: investor inquiry, correlation and regression analysis.

Keywords: behavior finance; behavioral deviations; investment decisions

Reference to this paper should be made as follows: Bikas, E.; Saponaitė, V. 2018. Behavior of the Lithuanian investors at the period of economic growth, *Entrepreneurship and Sustainability Issues* 6(1): 44-59. http://doi.org/10.9770/jesi.2018.6.1(4)

JEL Classifications: D9, D14, E71

1. Introduction

Scientists now speak and write about the psychological factors of investors, the decision-making processes, and the importance of financial behavior. In the past, the importance of psychology in investment processes was not

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

separate because it was considered that society was rational, rational at decision-making and interpreted the information and knowledge that was rightly understood.

The idea of effective market theory, which has been studied, speaks of rational investors who rationally manage their investment portfolio, rationally respond to ever-changing information and make rational changes to newly-received information. They do not focus on short-term deviations that are not attributable to rational actions. Effective market theory also speaks of irrational investors, but, according to the theory, they do not make a big impact on the market, because their actions are non-permanent, and, therefore, do not distort the market. Basic economic theories (Absolute income, permanent income and life cycle theory) are also oriented towards rational investors, but these theories already mention the psychological factors, that influence the behavior of people. Financial behavior begins when the scientists begin to speak not only about rationality, but also about the influence of internal and external factors on decision making.

The assessment of investor behavior when making investment decisions are important for the government, investment fund managers, other financial market participants and investors themselves (Jelnova, 2013). The government is relevant on budget debts that arise every year, so it is necessary to raise additional funds for debt reduction. The government takes into account the standard behavioral deviations of investors, can focus on them and offer attractive bonds to investors (Ozerchuk, 2014).

For fund managers it is important to identify common types of investors and their characteristics that encourage them to make certain investment decisions. The fund manager, having identified the characteristics and type of investors, can, depending on investor's deviations and behavioral patterns, create attractive portfolios for investors according to their types. In this way, there is a motivation in investing, which in the past was unattractive due to certain emotional barriers or behavioral deviations.

Meanwhile, determining the behavioral typology it would give the investor the appropriate added value, because he could identify himself as an investor. Understanding how actions are influenced by behavior it is important both for self-help and investment decision-making. Having identified irrational deviations, an investor can identify them and draw attention to them when making decisions. Also, aware of his behavioral deviations, he can choose the right investment instrument.

An investor-type and behavioral deviation study was conducted three years after the peak of the financial crisis, then repeated three years later, i.e. 2010 and 2013. It was decided to repeat this study three years later (2016) in the context of economic recovery, in order to analyze investor behavior. Has the economic recovery affected the behavior of investors, have they become more rational, or maybe investors have forgotten the price of possible negligence and became less prudent and take irrational decisions?

The aim of the paper is to identify the types of the Lithuanian investors dominating in Lithuania, whose behavioral deviations influence the behavior of investors in Lithuania after the financial crisis, while making investment decisions. The qualitative and quantitative methods are used to perform the research: investor inquiry, correlation and regression analysis.

2. Financial behaviour design

The modern financial market is affected by many factors: the abundance of information, accessibility, economic processes, political and legal constraints, and so on. However, the greatest influence is made by people's reaction to certain situations, events that were or are now taking place, and the perception of the situation itself. Every investor constantly makes personal decisions, no matter what financial instruments he or she operates. All

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

investors, starting with beginners and ending with experts, have to answer many questions: what kind of financial instruments to buy what risks to take, how diversify the portfolio, etc. Investors know and use modern portfolio theory, create efficient portfolios, use statistical data analyze that help them to select a specific financial instrument. In other words, investors are already thinking of rational market participants and base their decisions on calculations: probability theory, statistics and financial mathematics. However, the researchers argue that the decisions made by investors are strongly influenced by psychological stimuli that are associated with financial behavior. Financial behavior is a combination of finance and psychology. This is a science that analyzes market situations in which active participants are showing limited rationality and complicity (Bikas, 2010). Financial behavior is based on empirical human-social and emotional research to understand the financial decisions made by the investor. According to Shefrin (2001), financial behavior is the science of the impact of psychology on financial markets and the decision-making process. Psychology deals with behavioral processes, and how these processes affect human actions that differe from traditional economic assumptions. The variety of financial behavior definitions is very wide. The authors emphasize the novelty of the theory of financial behavior, which derives from classical financial theories, paying attention to the changes in society. Classical financial theories are complemented by new - psychological factors that encourage investors to make one or the other decision (Table 1).

Table 1. A variety of financial behavior definitions

Author	**Year**	**Definition**
Goldberg et.al.	1999	Behavior-oriented financial market theory: a discipline based on the fact that people are only rational to a certain extent.
Fuller.	2000	The financial behavior seeks to explain the regularities of investors' thinking processes, as well as the emotional processes involved and the extent to which they influence decision-making.
Fromet	2001	Financial behavior examines how investors collect, submit information when making investment decisions.
Ritter	2002	Financial behavior seek to supplement the standard financial theories - incorporating psychological aspects into the decision-making process.
Levy et.al.	2005	Theories that can explain market inefficiencies and market anomalies.
Bodie et.al.	2007	Financial market models that highlight the impact of potential psychological factors on investor behavior.
Jordan, Miller	2008	A financial area that analyzes investor thinking about the decision acceptance and market prices.
Gitman	2008	Research that explains the role played by emotions and other subjective factors in making investment decisions.
Lovric et.al.	2008	Financial behavior is a finance sub discipline that uses cognition and social psychology insights to the knowledge of how investors make financial decisions.
Thaler et.al.	2009	Integration of classical economics and financial theory with psychology and decision-making in exploratory sciences.

Scientists have different definitions of financial behavior, but everyone talks about the irrationality of a person and the importance of his decision making, about distortions in the market, and the anomalies that arise when irrational decisions are made. The presented financial behavioral attitudes form the premise that decisions depend on people's personal qualities, individuality, emotional state, etc. Understanding the behavior of investors begins with knowing the factors. It is recognized that economic behavior is not limited to qualitative market events and quantitative data analysis, but also reflects the perception, understanding and evaluation of events and data of economic entities, while emphasizing the importance of subjectivity in making financial decisions (Mentel et al. 206; Michailova et al. 2017; Sinem et al. 2017; Ohotina et al. 2018; Kunitsyna et al. 2018). D. Kahneman and A. Tversky (1981) first proved that the behavior of irrational investors is the consequence of understanding and processing incorrect information and proving how errors of reasoning emerge and become firmly established in our tinking. Recently, the focus of research on investor behavior and its impact on investment performance has

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

continued to grow, with particular attention being paid to identifying and rating investor typologies. The approach to risk and uncertainty is significantly affected by financial behavior and investor types. According to Aleknevičienė (2004), investors' attitude to risk and uncertainty is uneven. Some investors tend to risk more, others less. Depending on the risks, the following investor types are distinguished:

- Conservative - assumes a low level of risk, invests in shares and bonds of large and stable issuers. This type of investor strives for maximum confidence in the expected results of portfolio.
- Modest - assumes a moderate level of risk, invests in shares and bonds of large and medium-sized issuers. This type of investor assumes lower reliability for the expected results of its portfolio, in order to obtain higher profitability compared to Conservative type investor.
- Aggressive - assumes a high level of risk, invests in randomly selected issuer's shares. This type of investor is looking for the highest profitability from the formed portfolio.

Jerry Robinson (1999) expands the investor classification, distinguishing:

- Avoiders - the most careful, hoping for the worst case and often loses, because without risk, he loses great opportunities on the market.
- The headaches is avoiders opposite and often risks too much. He ignores the facts, does not look at the risk, and very often fail because he is not careful.
- Adventure lover - enjoys the risk that is challenging and enjoyable for him. He is looking for opportunities to take risks, but he does not do it blindly and has certain limits. Most often, these are market speculators.
- The calculator - understands that in order to go forward, you need to take advantage of the opportunities, but each of them is on his own risk. Before deciding, this investor strives to gather as much information as possible, to evaluate what the result are and how to reduce the risk.
- A conservative investor can be compared to a avoiders type investor, a modest investor with a calculator, an aggressive investor type, respectively, a headache or an adventurer. Meanwhile, Pompian (2010) divided three investor personality dimensions:

1. Idealist (I) versus Pragmatist (P)
2. Framer (F) versus Integrator (N)
3. Reflector (T) versus Realist (R)

On the other hand, Pompian has identified 8 investor personality types based on decisions made and their deviations (Fig.1.).

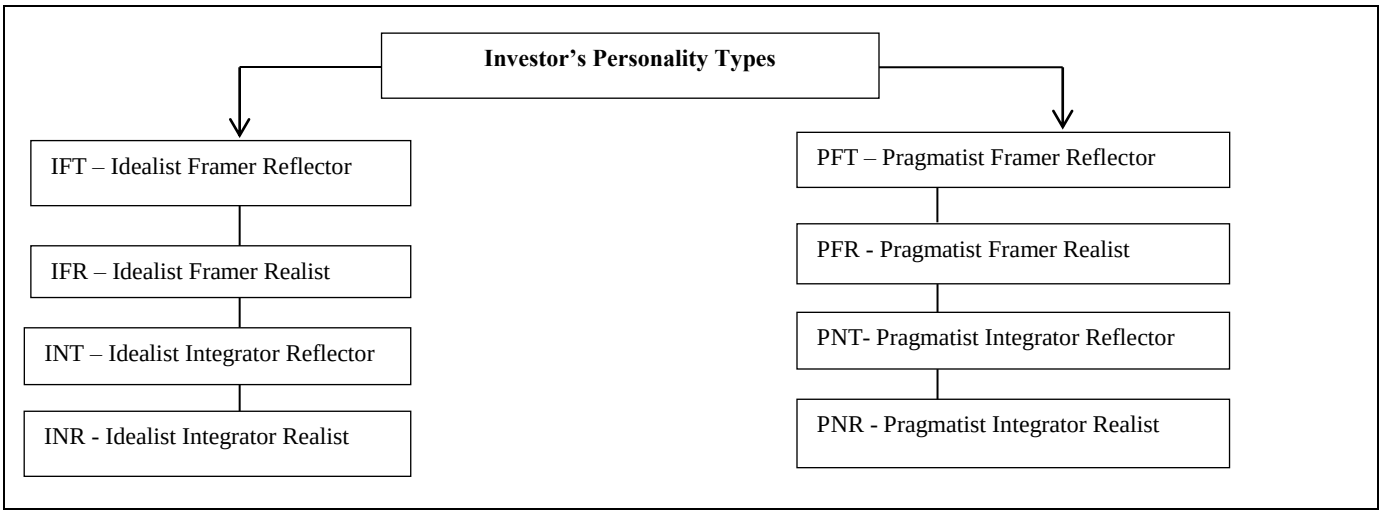


Figure 1. Investor's personality types (*Source*: Pompian, 2010)

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

According to Pompian in market, the following investors are active: The Idealist (I) overestimates the investment capability, reveals too optimistic capital markets and does not seek additional information that contradicts his convictions. He believes that better than average perceptiveness and intelligence gives him better control. These investors do not perform detailed analyses. Such investors demonstrate excessive self-confidence, an illusion of control, newness, representation, optimism, and self-tie-in.

The pragmatist (P) demonstrates real perceptions of their possibilities and limitations. This type of investor trusts the capital market and has a healthy scepticism in terms of his knowledge. He understands that investment activity is probabilistic, and carries out a detailed analysis of the market. Normally, it does not show a deviation from rational behavior.

The framer (F) demonstrates trends, attachment to certain events or situations, does not look at how a particular investment looks in a common investment portfolio. There is no flexibility in analyzing problems, not thinking about various external stimuli that could affect the overall portfolio due to some reckless investment. He usually demonstrates standing/anchor, conservatism, mental accounts, avoiding uncertainty, framing.

An integrator (N) is able to examine the wider context and external information. He sets up his investment portfolio as a whole, composed of different particles that are interdependent. Investor understands that the investments correlate, and depending on that, they form their own investment portfolio. Flexibly takes into account the market and prices of financial instruments. These investors do not show the deviations of the frames.

The Reflector (T) is afraid to assume responsibility because he does not seeks to live with the results of his decisions. He justifies and reasonably interprets the reasons for his mistakes, accepts no responsibility. Demonstrates these deviations: cognitive dissonance, self-control, exposure, avoidance of loss, avoidance of regret, factual situation, supposed prediction.

Realist (R) assumes all responsibility for his actions. He does not feel sorry for it, so it's easy to make decisions in difficult circumstances. The investor does not show the deviations that are indicated by the reflectors.

In addition, the author distinguished emotional and cognitive deviations that cannot be related to rational behavior in making investment decisions, as all the investors have these abnormalities (Table 2, Table 3).

Table 2. Emotional deviations

Sphere	**Explanation**
Endowment	Individuals value specific assets more when they have the right to dispose of them.
Self-control	Human consumes today what he will consume tomorrow.
Optmism	A person does not see facts and reality, looks too optimistic about the future, events, decision making.
Lossaversion	A situation where a person feels a stronger impulse to avoid loss than to earn profit.
Regret aversion	The person does not take decisive action because he fears that any decision will still be inadequate.
Status Quo	Prepare a person with a range of decision options to choose any solution that confirms the existing status quo instead of other alternatives that bring about changes.

(*Source*: Pompian, 2010)

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

Emotional deviations describe the behavior of an investor, which occur through the loss of an asset, the possible occurrence of a loss, or the misunderstanding of his own decision. Emotional deviations are such as when an investor realizes that he himself is responsible for the rebound of an action.

Table 3. Cognitive deviations

Sphere	**Explanation**
Overconfidence	The investor does not justify the belief in his decisions, cognitive abilities.
Representativeness	The new experience is attributed to a totally different (rather than actual) experience.
Anchoring and adjustment	Imagine any initial value, i.e. anchor, and solutions tailored to it.
Cognitive dissonance	Newly-received information is often in conflict with the human's previous understanding, mental discomfort.
Availability	Estimated probability based on previous experience.
Self-attribution	When a person attributes to himself successful experiences.
Illusion of control	When a person is convinced that the final result is in his hands.
Conservatism	When a person firmly adheres to his or her previous opinion or forecast without paying attention to new information.
Ambiguity aversion	People are dwindling in unclear situations where ambiguity occurs.
Mental accounting	The tendency of a person to encode and evaluate economic results by grouping property into various irreplaceable mentalities accounts.
Confirmation	A certain variety of selective perception, when emphasized, highlights ideas that confirm human beliefs and overestimate all that contradicts human beliefs.
Hindsight	Confidence that, after certain events, a person finds out that this was expected to happen.
Recency	The inclination to notice more frequently and to accentuate news and new discoveries on information obtained earlier.
Framing	Trend when a person makes decisions based on what situation he is showing at that particular moment.

(*Source*: Pompian, 2010)

Meanwhile, detailed cognitive deviations indicate the influence of decisions on personal decisions. All cognitive deviations are irrational, legitimate actions of the investor, show the fear of novelty, and draw attention to the tendency not to take responsibility, instead to accuse the environment, inaccuracy of information, another person, but not himself.

3. Lithuanian investor inspection methodology

The purpose of the survey is to identify and assess the types of investors in a stable economic, political situation in the country, i.e. 2016 and the obtained results compared with previous studies of this type in assessing changes. Research method - an investor survey. The Pompian (2010) investor-type model was used to interpret the research and the results. Using this model, it is possible to accurately identify the types of investors based on people's actions and patterns of thinking and their deviations.

The research is conducted on the Internet site, on the social page www.manoapklausa.lt, in order to attract the largest possible number of inhabitants of different cities in Lithuania. The aim is to make the questionnaire as objective as possible, without any influence on the respondents.

The research sample is persons living in the territory of the Republic of Lithuania who are over 20 years and who will be selected on the basis of quota selection. According to the data of the Department of Statistics, at the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

beginning of 2015, 2,325,402 people over the age of 20 lived on the territory of the Republic of Lithuania. Due to this large number of people, the sampling method was chosen to determine the sample size of a whole:

$$\mathbf{n = \frac{z^2 * p\,(1 - p)}{e^2};} \qquad (1)$$

Where: n - required sample size; z - Standard Error Size Units in Normal Distribution, which will meet the desired degree of reliability; p is the proportion of the whole that corresponds to the prevailing characteristics; e - sampling error.

In this case, the confidence level (z) 95% is chosen, for this degree of reliability at z = 1,96, the ratio of the total (p) to 0,5, i. e. the pessimistic option is chosen, with only half of respondents show prevailing characteristics and a selection error (e) of 6%. Therefore:

$$\mathbf{266 = \frac{1.96^2 * 0.5\,(1 - 0.5)}{0.06^2}}\,.(2)$$

To perform this research, 266 people were interviewed for the results to be representative. To determine the behavior: deviation, behavior and type of the Lithuanian investors, the Pompian (2010) methodology is used. According to this method, a questionnaire was created to help to identify the type of investor behavior, the deviations inherent in a certain type.

The questionnaire consists of 3 parts:

- **Identification of the respondent.** Identification of respondent's gender, age, education, activity, monthly average income and managed assets.
- **Saving, investing.** Identify whether respondents are saving on motives that encourage them to save money, how much they save per year, and whether they are financially investing.
- **Behavioral determination.** Determine the respondents' behavior type. This section is intended only for the investing respondents identified in the second part of the questionnaire. According to the answers selected in the survey, the respondent is assigned as a type specific to the answer variant. Analyzing each respondent, he is assigned as a certain type of Pompian investor's personality.

Results are compared with two performed studies: E. Bikas, A. Kavaliauskas, 2010 and E. Bikas, D. Jurevičienė, L. Novickytė, G. Keliuonytė-Steniulienė and P. Dubinskas in 2013 (Bikas et al. 2013).

4. Research results

Empirical research was made in January - May 2016. The survey interviewed 306 respondents. The survey was attended by 102 men and 204 women. The largest monthly income of respondents ranges from435 EUR to 869 EUR, representing 40 % of all respondents' choices. 22 % of respondents receive up to 1 304 EUR per month. One fifth of the respondents receive higher income than 1,304 EUR and the remaining 16 % receive up to 435 EUR per month, three quarters of respondents are educated and have university education, 16 % of respondents have college education. 66 % of respondents are employees, 14 % of respondents have their own businesses, 7 % are state employees, and the remaining 13 % are unemployed. Empirical research results showed that 72 % of respondents save, 52 % of household make budgets and almost all respondents who have a household budget have a financial plan. Positive replies to this question made 50% of respondents. During the survey, one third of the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

respondents respond that they make financial investments and participate in a further study on investors' financial behavior and investor type.

Only those questionnaires that indicated that the respondent was investing was involved in the study. The vast majority of respondents manage the tangible and financial assets of 2 900 EUR - 14 480 EUR. 33 % of respondents manage assets ranging from 14 481 EUR to 57 924 EUR. 12 % of respondents manage assets of higher value.

Analyzing the results of the survey, it was found out that the majority of respondents are characterized as the idealist – framer/integrator-realist. Their distribution by gender is almost the same: men with this type are 27 units and women are 28 units. According to the Pompian theory, people of this type are mostly characterized by deviations in idealistic behavior, which have excessive self-confidence, an illusion of control, novelty, representation, optimism, and self-confinement. Sometimes there are also fringe deviations that demonstrate standing / anchor, conservatism, mental accounts, avoiding uncertainty, framing. These deviations are often obscured by the type of the integrator, which is inverse to the type of framer. People of this type do not show the reflector's deviations, because according to the survey results, respondents demonstrate the character of a realist type. The pragmatist-framer-realist type was only male, no female was identified by the type mentioned above. A type that is characterized by all possible behavioral deviations is an idealist-framer-reflector -for the most part, this type of investor is characterized by women (Fig.2).

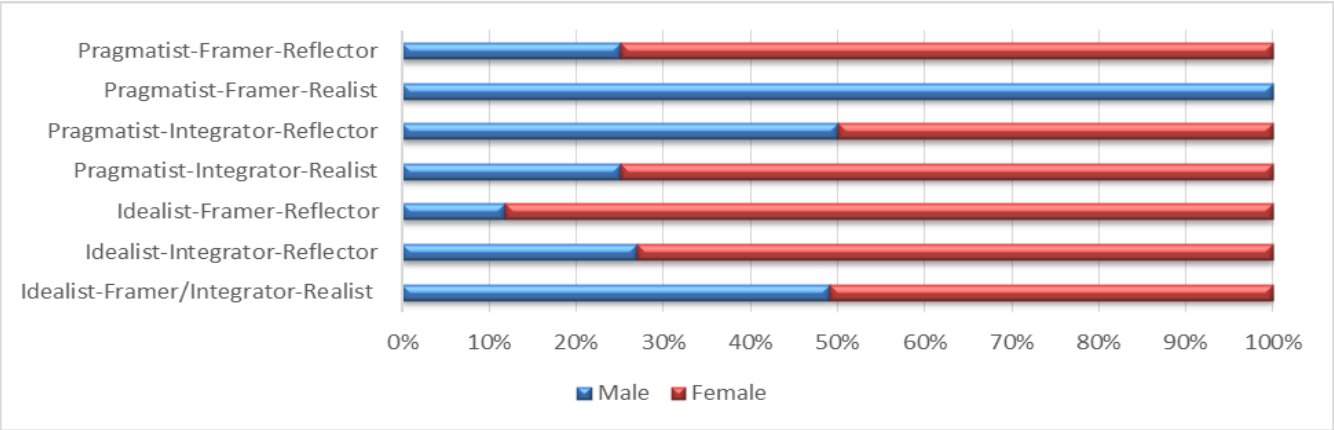


Figure 2. Distribution of respondent types by gender (*Source*: created by the authors)

By analyzing types by age, it is noticeable that the features of idealist-integrator/framer-realist are characteristic to all age groups (except for respondents in the 60 - 69 age group). This type of respondents is mostly in the age group of 20 - 29, but these types of deviations are also characterized by respondents aged 40 - 49. The respondents who are characterized by all possible deviations in behavior are idealistic-framer-reflector. According to research results, all this type of deviations are characterized by the respondents which are 20 - 39 and 50 - 59 years old. Strangely enough, a type that does not show any behavioral deviations (pragmatist-integrator-realist) is characteristic of only two age groups, i.e. 20 - 29 years old and 60 - 69 years old respondents. Respondents aged 20 - 29 are visible in all types, with the exception of pragmatist–framer-realist. The respondents of this type are only standing/anchor, conservatism, mental accounts, avoiding uncertainty, framing. Pragmatist-framer-realist type has respondents of 50-59 years (Fig.3).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

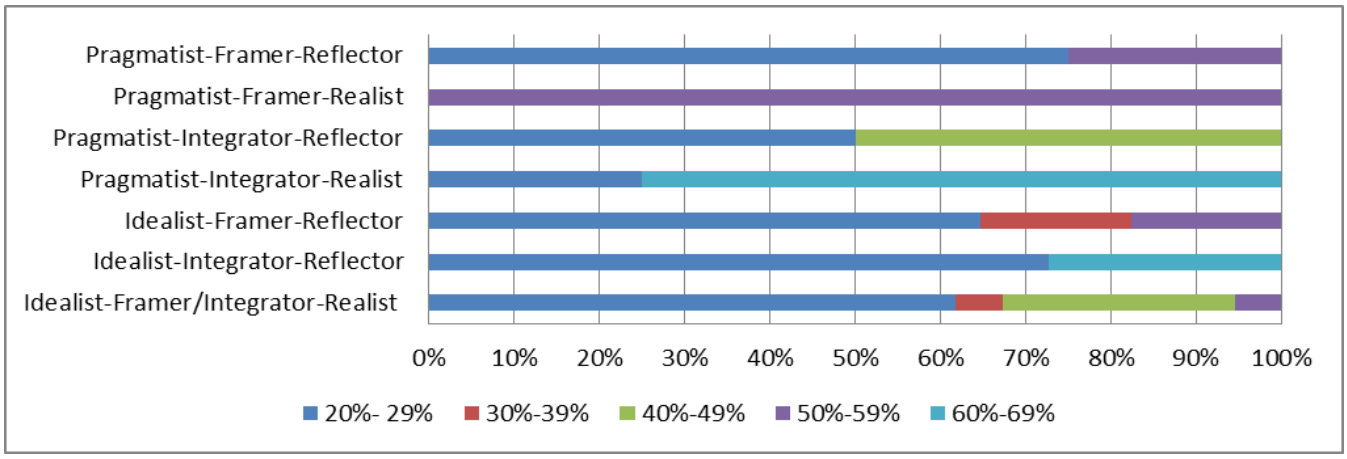


Figure 3. Distribution of respondent types of behavior by age (*Source*: created by the authors.)

The monthly income received by respondents does not have a significant impact on the investor type. Respondents who do not have any behavioral deviations (pragmatist-integrator-realist), according to the survey, receive 870 EUR - 1 304 EUR per month. Respondents with all possible behavioral deviations (idealist-framer-reflector) do not differ in income, they are distributed through all possible income groups. The respondents with the highest monthly income for pragmatist-framer-realist are men between 50 and 59 years of age (Fig. 4.).

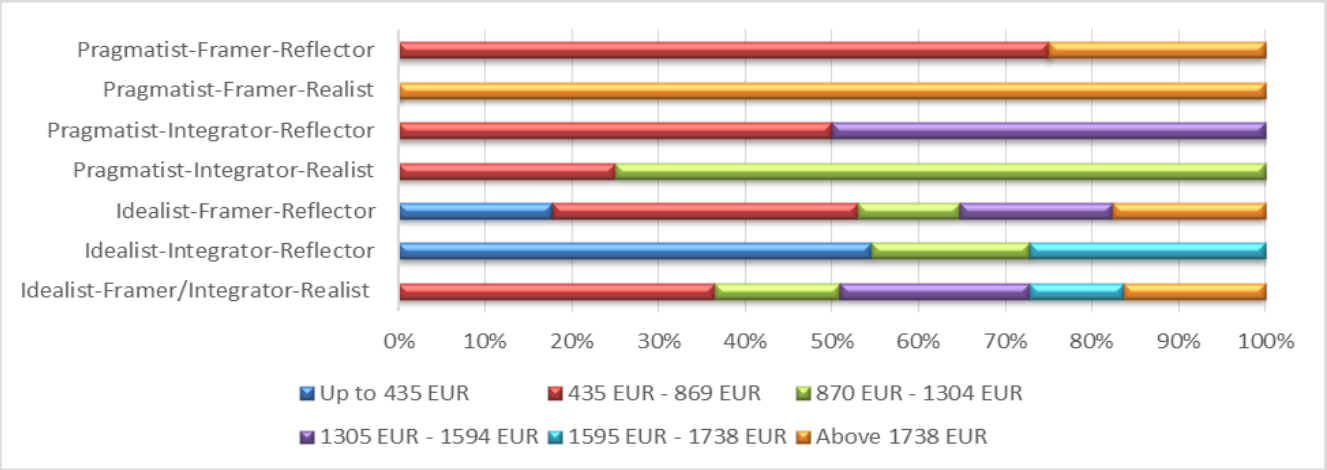


Figure 4. Distribution of respondent types of behavior by monthly income (*Source*: created by the authors)

The distribution of respondents by employment is depicted in Fig. 5. Hired workers are mostly distinguished by the types of pragmatist-integrator-realist and idealist–integrator-reflector. Also, employed workers are the only ones who are completely devoid of behavioral deviations - this is the type of pragmatist–integrator-realist. State employees are distributed in almost all types of investors, but they are the only ones that are characterized by pragmatist–framer–realist type deviations. The unemployed are distinguished by the deviations of the idealist–framer-reflector, which means that they have all deviations of behavior. The owners of the company are characterized by the idealist-framer/integrator-realist and pragmatist-integrator-reflector types. Young people were divided into only the idealist-framer/integrator-realist type (Fig. 5.).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

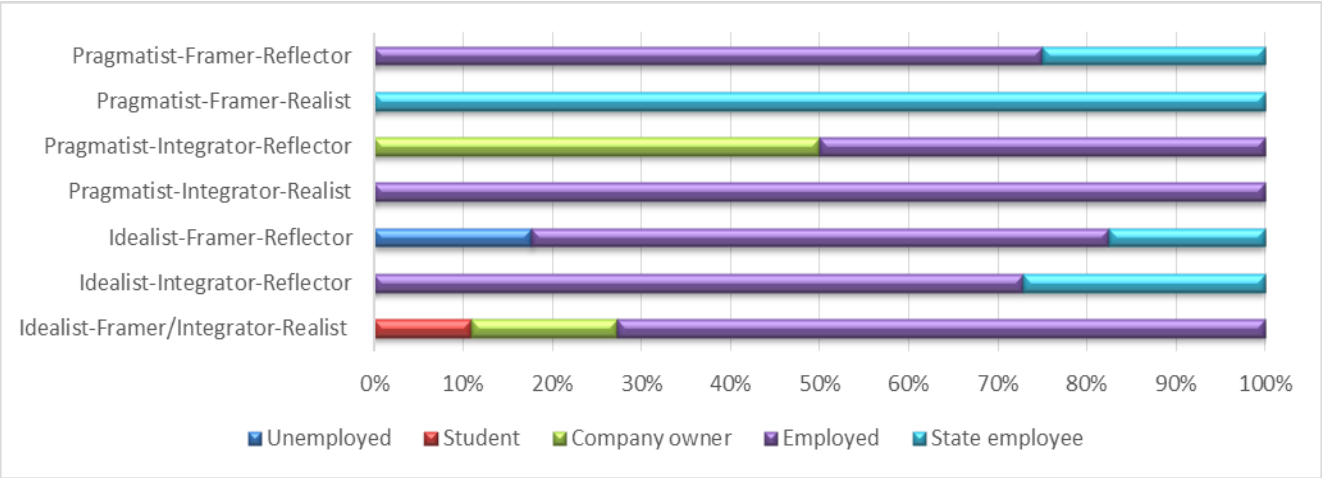


Figure 5. Distribution of respondent types of behavior by employment (*Source*: created by the authors)

Education does not affect the type of investor (Fig. 6.). Respondents with university education are distributed according to all types of investors. Respondents with basic, secondary and college education are only in the most common type, i.e. y idealist-framer/integrator-realist. A type that has all the possible deviations (idealist-framer-reflector) can only be people with basic education. Meanwhile, respondents with secondary education are also demonstrating non-deviating types (pragmatist–integrator–realist) compared with those with university education.

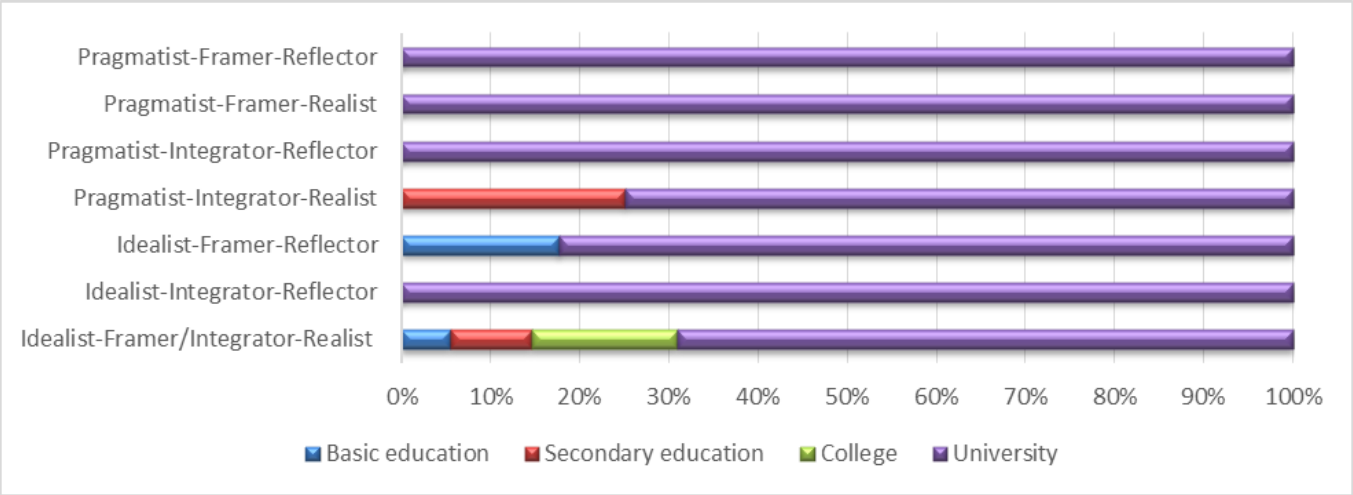


Figure 6. Distribution of respondent types of behavior by education *(Source*: created by the authors)

The types of the Lithuanian investors were identified (Table 4). The red line allocates respondents to rational and irrational investors and with certain behavioral deviations. On the left side of the red line are respondents with two or three signs of irrational investor type, and to the right of the red line are respondents with two or three rational investor type attributes. As it can be seen from the results obtained in Table 4, more than 40 % (i.e., 45.45 %) of the Lithuanian investors are rational, only partially surrendering to emotions. They demonstrate the rational behavior of the irrational behavior of impurities (the good qualities of these investors reflect two or three of the rational investor type attributes). These types of investors are characterized by realistic possibilities, pragmatism, broad perspective, activity, sometimes pessimism and self-accusation. Empirical research has shown that 4.04 %

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

of Lithuanian investors' behavior is completely unrelated to irrational behavior, they are completely rational investors who do not show any behavioral deviations. Fully irrational investors (those with deviations from rational behavior) account for 17.17 %, and the total number of irrational investors (whose bad investor characteristics are reflected by two or three characteristics of an irrational investor type) is 54.54 %. These respondents are characterized by overestimation of opportunities, illusion of control, conservatism, inspiration, avoidance of loss, over-optimism, narrow-mindedness, passivity and accusation of circumstances.

Table 4. Distribution of Lithuanian investors by types (%). (*Source:* created by the authors)

Overestimation of opportunities, Excessive optimism, Narrow attitude, Passivity, Circumventive conviction		Realistic assessment of opportunities, Pragmatism, Pessimism, Wide approach, Activity, Self-accusation	
←		→	
Idealist-Framer-Reflector	Idealist-Framer-Realist; Idealist-Integrator-Reflector; Pragmatist-Framer-Reflector	Pragmatist-Integrator-Reflector; Pragmatist-Framer-Realist; Idealist-Integrator-Realist	Pragmatist-Integrator-Realist
17,17	37,37	41,41	4,04

Analyzing the Lithuanian investor profile, the results of the respondents were combined according to the types of investors and deviations from rational decisions (Fig. 7.). It turned out, which part of the Lithuanian investors have specific deviations from rational decision making, and what are those deviations. 50 % of respondents have deviations in idealist behavior. These respondents rely too much on their own strengths and decisions. It is also very optimistic about the future, following only the current information available and making decisions based on such information. It is also convinced that only their insights give the desired (positive) result. Imagine being able to control any situation, though this is not the case. Indirect investors are distributed around the framer and reflector deviations. 27 % of the respondents noted the deviations of the framer's behavior. These investors come from the initial value and combine their decisions, and also firmly adhere to their existing regulations and do not change their opinions and behavior when they come to new, changing information. Some investors tend to estimate economic results by grouping assets into various irreplaceable ones, i.e. y mentally-minded accounts, which are not a proper behavior for the investor, since the mentor's account causes the investor to make inappropriate decisions. 23 % of respondents are incapacitated, such respondents are afraid to take decisive action because they are not sure that the decision may not be optimal. If the change is already done and the worst case happens, then the respondent (after the event) is disappointed with his decision, because the investor knew that this should have happened. Also, these investors feel a stronger impulse to avoid losses than earn a profit.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

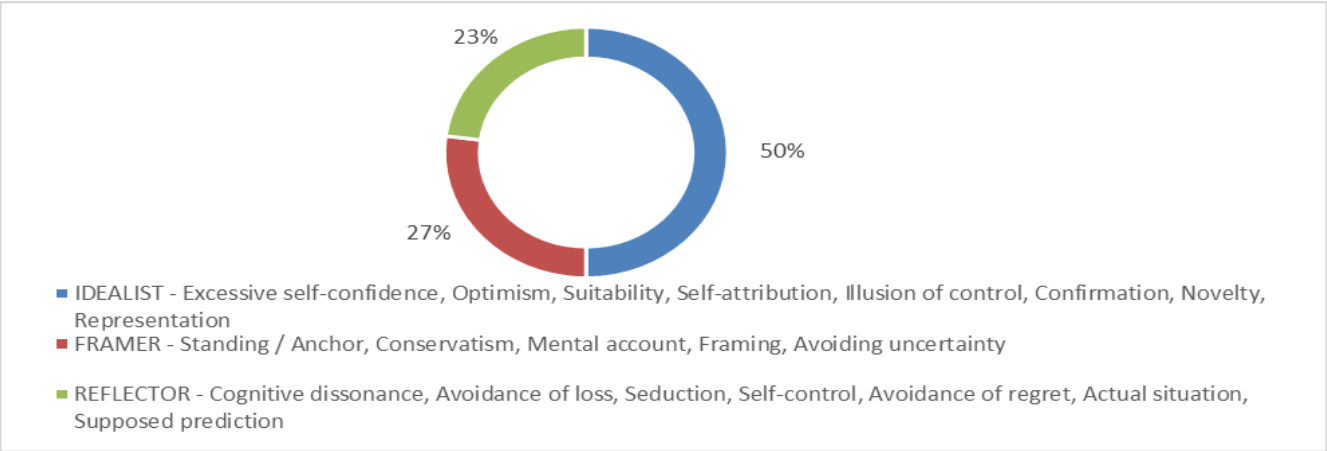


Figure 7. Respondent behavioral deviations from rational decisions. (*Source:* created by the author)

Summarizing the data of the research carried out, it is evident that the majority of respondents are distributed in the type of idealist-framer/integrator-realist. Only 17 % of respondents are characterized by all possible behavioral deviations that are typical for the idealist–framer-reflector type. However, only 4 % of respondents do not show any behavioral deviations. Based on the results of this research, respondents mostly have only one type of behavioral deviations. To say that respondents have become less rational after the financial crisis is nor right, their behavioral deviations are still affected by behavioral deviations, and in particular by avoiding losses.

Investors who do not show any deviant behavior make only 4.04 %. Rational investors with some irrational impurities are about 41.41 %. However, according to the survey results, irrational investors account for more than rational (54.54 % of irrational respondents and 45.45 % of rational and partially rational respondents). The majority of investors with certain behavioral deviations are characterized by idealistic behavioral deviations. They are characterized by excessive self-confidence, self-attribution, illusion of control, and optimism. Regular respondents have characteristics of the framers and reflector behavior - conservatism, mental accounting, anchoring, loss avoidance, regret, and supposed prediction of the situation.

The results of the research are compared with the results of a study carried out by E. Bikas, A. Kavaliauskas (2010) and the research carried out by E. Bikas, D. Jurevičienė, L. Novickytė, G. Keliuonytė-Steniulienė and P. Dubinskas (2013). These authors conducted surveys of investors in 2010 and 2013, and outperformed investor types using the Pompian model.

During the research, it turned out that in 2010, 13 % of respondents noted a completely rational behavior (pragmatic-integrator-realist), while the author's study revealed that the percentage of completely rational investors dropped threefold, i.e. it make now only 4.04 %. 40% of the respondents were rational investors, who partially do not respond to emotions, demonstrate rational behavior with irrational behavioral impurities (pragmatic-integrator-reflector, pragmatic-framer-realist, idealist-integrator-realist). The same result was obtained in this empirical study. The 2010 survey found out that irrational investors with rational behavioral impurities made 39 %, and it turned out such type of investors make 37.37 %. Meanwhile, totally irrational investors in 2010 were only 8 % of respondents, and during the research it turned out that there are 17.17 % of respondents of such type. The results of both surveys show that men are more rational investors than women, who make emotional decisions and are more responsive.

In the 2010 empirical study, it turned out that the majority of respondents, even 77 %, have a type of framers behavioral deviations. They are conservative, they accumulate assets into mental accounts (this forces the investor

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

to make inappropriate investment decisions), framing, avoiding uncertainty and anchoring. 35 % of the respondents have idealist behavioral deviations. Meanwhile, in this study, it turned out that even 50 % of respondents have behavioral deviations of idealist type. These respondents are more likely to trust themselves too much, assign merit to themselves, optimistically look at the situation, imagine that they control situation by 100 %. More than a quarter of respondents noted the deviations of the framer's behavior, i.e. y 27.11 % of respondents. 22.89 % of respondents were characterized by avoidance of loss, regret avoidance, supposed prediction, in other words, reflector-type behavioral deviations.

Summarizing the results of both surveys, it can be seen that there were more rational investors in 2010, which were only partially characterized by behavioral deviations. Most of these rational investors were men, and women were more likely to have behavioral deviations. Respondents with behavioral deviations tended to be marked by deviations from the framer. The 2016 study found out that there are more irrational investors with behavioral deviations. The most common behavioral deviation among respondents was the type of idealist. They trust themselves too much, are optimistic and think that everything depends on them. Men were most rational investor types, and women were more irrational.

Comparing the survey results of 2013 with the results of the research carried out by E. Bikas, D. Jurevičienė, L. Novickytė, G. Keliuonytė-Steniulienė and P. Dubinskas in 2013, 14 % of respondents were marked by a completely rational behavior (pragmatist-integrator-realist), revealed that while in the research of the author it indicated that the percentage of completely rational investors dropped threefold, that is, now only 4.04 %. 48 % of the respondents were rational investors, who partially do not respond to emotions, demonstrate rational behavior with irrational behavioral impurities (pragmatic-integrator-reflective, pragmatic-framer-realist, idealist-integrator-realist). A similar result was obtained in this study, with 41.41 % of this type of respondents identified.

The 2013 survey found out that irrational investors with rational behavior impurities were 36 %, and today they 37.37 % indicated. Meanwhile, totally irrational investors in 2013 were only 2 % of respondents, and during the research it turned out that there are even 17.17 % of respondents, i.e. y almost 9 times higher than in 2013.

It is also estimated which type of investor dominates by gender. In 2013, the distribution of all types by gender was equal. The type of idealist – framer – reflector was distinct (the type with all possible behavioral deviations), which was noted only for the woman, and the idealist–integrator- reflector dominated by men. Types of women were pragmatic-framer/integrator-realistic. The results of the 2013 survey showed that women are more pragmatic and that men tend to be more idealistic. In the 2016 study, the gender outcomes were slightly different, men were more pragmatic and women were idealistic. The only exception is that only men were pragmatic-framer-realist type. The size of an entirely irrational investor type was marked by both women and men, but the number of female investors is higher than that of men. And during this study, it turned out that men are more rational investors than women.

Summarizing the results of the research, it can be seen that, as in 2013, there were more rational investors who, in most cases, only partially have behavioral deviations. Most of these rational investors were men, and women were more likely to have behavioral deviations. The 2016 study indicated that there are more irrational investors with behavioral deviations. Men were most marked by rational investor types, and women were more irrational.

The likely difference between the results of the research (the investors were more rational during the crisis period, and now investors are more likely to have different behavioral deviations) was affected by the fact that in 2010 and 2013 investors were somewhat more cautious because during the crisis period it was necessary to cautiously carry out financial investments in order to minimize the risk of losses. Meanwhile, at the moment, respondents have become more irrational and make decisions less thoughtful and impulsive. This may have an effect on the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

recovery of the economy, the Bank of Lithuania predicted that in 2016, Real GDP of Lithuania will increase by 2.6 % - significantly more than in 2015 (1.6 %). In the longer term, namely in 2017, economic development should accelerate further, as it would boost by the growing economic development of many regions of the world. Also, in recent years, wages grew by 5 % a year, and this year, with further declining unemployment and a rise in the minimum wage, its growth rate should increase even more.

Conclusions

Analyzing the results of the survey, it is seen that the majority of respondents are characterized by an idealist-integrator/framer-realist. It can be argued that these are the dominant features of a typical Lithuanian investor's. Their distribution by gender is almost the same. People of this type are mostly characterized by excessive self-confidence, illusion of control, newness, representation, optimism, self-affiliation. Sometimes they demonstrate standing/anchor, conservatism, mental accounts, avoiding uncertainty, framing. However, they have a realistic view of the situation.

A type that is characterized by all possible behavioral deviations is an idealist-framer-reflector, representing 17.17% of all respondents and to a large extent women are of this type of investor. A type that does not show any behavioral deviations is pragmatist-integrator-realist; this type of investor makes only 4.04% of respondents.

The majority of investors with certain behavioral deviations are characterized by idealist behavioral deviations. Regular respondents are characterized by the characteristics of the framer and reflector behavior.

In 2010, there were more rational investors, who partially have behavioral deviations. The 2016 study found out that there are more irrational investors with behavioral deviations. In 2010, respondents with behavioral deviations tended to be inferior to the framer, and in 2016 the most common behavioral deviation among respondents was observed in the idealist type.

Comparing the results of the survey of 2013 and 2016, it has been observed that men are more rational investors than women. In 2013, there were more rational investors, which are only partially characterized by behavioral deviations. The 2016 study indicated that there are more irrational investors with behavioral deviations. This figure has increased by as much as 9 times in three years, in 2013 the total number of irrational investors was only 2%, and in 2016 the figure rose to 17.17%.

References

Aleknevičienė V. 2004. *Įmonės finansų valdymas* [Corporate finance management]. Akademija.

Bikas, E.; Kavaliauskas, A. 2010. Lietuvos investuotojų elgena finansų krizės metu [Behaviour of Lithuanian investor during financial crisis], *Verslas:teorija ir praktika* 11(4): 370-380. http://etalpykla.lituanistikadb.lt/fedora/get/LT-LDB-0001:J.04~2010~1367178995042/DS.002.0.01.ARTIC

Bikas, E.; Jurevičienė, D.; Novickytė, L.; Keliuonytė-Steniuliene, G.; Dubinskas, P. 2013. *Neprofesionalių investuotojų elgsena finansų rinkose* [Behaviour nonprofessional investors in financial markets]. Kaunas: Technologija,

Bodie, Z.; Kane, A.; Marcus, A. 2007. *Investments.* New York: McGraw-Hill.

Fromet, H. 2001. Behavioural finance - theory and practical application, *Business Economics* 7(1): 50-69.

Fuller, R. J. 2000. *Behavioural finance and the sources of alpha*. Retrieved from: http://www.fullerthaler.com/downloads/bfsoa.pdf

Ggoldberg, J.; Von Nitzsch R. 1999. *Behavioural Finance*, John Wiley&Sons.

Gitman, L.J. 2008. Study Guide for Principles of Managerial Finance by Lawrence J. Gitman (2008-02-11) https://www.amazon.co.uk/Principles-Managerial-Finance-Lawrence-2008-02-11/dp/B01A68SSJU

Jelnova, C. V. 2013. Analysis of the Practice of Decision-Making in the Field of Investment Policy, *Contemporary Economic Issues* 4.. http://doi.org/10.24194/41302

Jordan, B.; Miller, T. 2008. *Fundamentals of investments*. McGraw-Hill.

Ohotina, A.; Lavrinenko, O.; Ignatjeva, S.; Lonska, J. 2018. Socio-economic security as a determinant of regional differences in the investment climate in the region, *Journal of Security and Sustainability Issues* 7(3): 427-438. https://doi.org/10.9770/jssi.2018.7.3(5)

Tversky, A.; Kahneman, D. 1981.The Framing of Decisions and the Psychology of Choice, *Science* Vol. 211, 30 https://www.uzh.ch/cmsssl/suz/dam/jcr:ffffffff-fad3-547b-ffff-ffffe54d58af/10.18_kahneman_tversky_81.pdf

Kunitsyna, N.; Britchenko, I.; Kunitsyn, I. 2018. Reputational risks, value of losses and financial sustainability of commercial banks, *Entrepreneurship and Sustainability Issues* 5(4): 943-955. http://doi.org/10.9770/jesi.2018.5.4(17)

Levy, H.; Post, T. 2005. *Investment*, Prentice Hall.

Lovric, M.; Kayman. U.; Spronk, J. 2008. *A conceptual model of invest behavior*. Retrieved from: http://www.cse.salford.ac.uk/cogsys/CogSys-Lovric-update%20(2).pdf

Mentel, G.; Szetela, B.; Tvaronavičienė, M. 2016. Qualifications of managers vs. effectiveness of investment funds in Poland, *Economics & Sociology* 9(2): 126-137. http://dx.doi.org/dx.doi.org/10.14254/2071-789X.2016/9-2/8

Michailova, J.; Mačiulis, A.; Tvaronavičienė, M.. 2017. Overconfidence, risk aversion and individual financial decisions in experimental asset markets, *Economic research = Ekonomska istraživanja* 30(1): 1119-1131. http://dx.doi.org/10.1080/1331677X.2017.1311234

Ozerchuk, O. V. 2014. Analysis of the Impact of Public Crediting Policy on the Investment Activity in Ukraine, *Contemporary Economic Issues* 1. http://doi.org/10.24194/11410

Pompian, M. M. 2010. Behavioral finance and wealth management. Canada: John Wiley & Sonsh.

Ritter, J.R. 2002. Behavioural finance. Retrieved from: http://bear.cba.ufl.edu/ritter

Robinson, J. 1999. https://followthemoney.com/about/

Shefrin, H. 2001. Behavioural corporate finance, *Journal of applied corporate finance*. No. 14(3).

Sinem, P.; Bora, A.; Tvaronavičienė, M. 2017. Clustering in key G-7 stock market indices: an innovative approach, *Marketing and Management of Innovations*, 1: 300-310. http://dx.doi.org/10.21272/mmi.2017.1-27

Thaler, R.; Frame,s H.; Kahneman, D.; Tversky, A. 2000. *Mental Accounting Matters, in Choices, Values*. New York: Cambridge University Press.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(4)

Egidijus BIKAS is the Associated Professor of Finance, Vilniaus University. Research interests: behavioral finance, investment, portfolio management, taxation, public finance.
ORCID ID: orcid.org/0000-0002-9667-3730

Vitalija SAPONAITĖ is the master of finance, Vilniaus University. Research interests: behavioral finance, investment, portfolio management.
ORCID ID: orcid.org/0000-0002-5398-4862

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

HISTORICAL COST *VS* FAIR VALUE IN FOREST ACCOUNTING: THE CASE OF LITHUANIA

Ramunė Budrionytė[1], Lionius Gaižauskas[2]

[1,2] Vilnius University, Saulėtekio al. 9, Vilnius, LT-10222, Republic of Lithuania

[1]ramune.budrionyte@evaf.vu.lt; [2]lionius.gaizauskas@evaf.vu.lt

Received: 12 March 2018; accepted 5 May 2018; published 30 September 2018

Abstract. The accounting methods based on two concepts - accounting at historical cost and accounting at fair value - are responsible for the provision of information about the enterprise's assets in the financial statements. Taking into consideration the specifics of the national financial accounting regulation, the forests managed by the forestry enterprises can also be measured by using either of these two accounting methods. However, in terms of accounting, both of them pose certain problems or ambiguity. The purpose of the research is to evaluate the strengths and weaknesses of forest accounting methods based on fair value and historical cost and the practice of their use in Lithuanian forestry enterprises. The study examines scholarly literature and deploys the theoretical methods of comparative analysis, critical evaluation, systematisation, generalisation. The empirical research involved document content analysis, questionnaire survey. The article deals with the issues of the use of accounting methods for forestry accounting: traditional cost-based accounting methods do not reflect the biological forest transformation, hinders identifying the forest development costs and the end of their capitalisation, the method of a systematic derecognition. On the other hand, the essential complication of the use of the fair value method is that the forest largely lacks an active market with quoted prices. Thus, its fair value is determined on the basis of rather subjective assumptions by means of diverse valuation methods, resulting in unreliable and unverifiable information. The results of the research carried out into the forestry accounting policy observed in the Lithuania's private forestry enterprises revealed that forest accounting by cost is exclusively carried out by all the enterprises under investigation. Nevertheless, the method itself was interpreted quite differently. The article presents the modified forestry accounting methods by cost, which allow reducing the identified shortcomings.

Keywords: forest (stands); accounting methods; fair value; historical cost

Reference to this paper should be made as follows: Budrionytė, R.; Gaižauskas, L. 2018. Historical cost *vs* fair value in forest accounting: the case of Lithuania, *Entrepreneurship and Sustainability Issues* 6(1): 60-76. http://doi.org/10.9770/jesi.2018.6.1(5)

JEL classifications: M 41

1. Introduction

The meaning of the information presented in the financial statements on the entity's resources and results achieved largely depends on the deployed accounting and evaluation methods which are based on two concepts: historical cost accounting and fair value accounting. None of the concepts is ideal: the fair value is misleading in

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

terms of the profit and loss account (or: statement of profit and loss), historical cost – in terms of the balance sheet (Alexander & Fasiello, 2014). The benefits of accounting at fair value are obvious, as the information presented in the financial statements is increasingly becoming more relevant and appropriate not only for making economic decisions and cash flow forecasts, but also for reflecting changes in the market and their impact on the enterprise's performance. The shortcomings of accounting at fair value are as follows: unrealised amounts presented in the financial statements distort the meaning of financial ratios and may mislead the users, and most importantly, an unreliable, subjective, costly estimate of fair value is observed when various valuation methods are applied. Accounting at historical cost provides more reliable information about the enterprise's operations: assets are valued at cost, which is an objective and legally documented value that provides less opportunity for management to manipulate financial information. Furthermore, when using the historical cost method, a number of data in the financial statements are subjective, based on certain assumptions, while the value of the assets in the financial statements is significantly different from their market price, financial information is less appropriate for economic decisions.

The choice of accounting concept determines the further use of accounting methods in the enterprise leading to the selected type of presentation of financial information in the financial statements. Different accounting methods can be used for accounting assets belonging to groups of different business entities. Therefore, the forests managed by business enterprises are no exception and can be accounted for in one way or another taking into consideration the entity's accounting concept and the allocation of forest to one or another asset group.

The purpose of the research is to evaluate the strengths and shortcomings of forest accounting methods based on fair value and historical cost and the practice of their use in Lithuanian forestry enterprises. The study examines scholarly literature and deploys the theoretical methods of comparative analysis, critical evaluation, systematisation, and generalisation. The empirical research involved document content analysis and questionnaire survey.

2. The strengths and shortcomings of applying cost and fair value methods to forest accounting

The way forest information is presented in the financial statements is one of the key issues in the financial reporting carried out by forest managing enterprises. The solution of this problem depends, first and foremost, on the accounting concept applied by the enterprise. The use of cost-based accounting methods in forest accounting allows the presentation of reliable and verifiable information in the financial statements and reduces the manipulation possibility for management. Also, there is no need to periodically determine the fair value of the forest, i.e. to use time-consuming and / or financially exhausting procedures. The fair value accounting methods ensure the presentation of forests in the balance sheet at their fair value. This type of forest accounting is not only relevant to the users of information obtained from financial statements in the process of taking economic decisions, in particular, the decisions on the long-term prospects of the enterprise, the future cash flow forecast, but also enables the financial statements to reflect forest biological transformation and the impact of market conditions.

Cost-based accounting methods are traditional, common and known to financial report providers, therefore, they are popular. However, their application to forest accounting is ambiguous: it is difficult to identify the costs included in the cost of the forest, and in particular the final point in determining the cost. Apart from that, it is doubtful whether the concept of fixed assets depreciation is suitable for forest accounting if the forest is recognised as fixed assets. The specificity of forestry activities leads to a conflict when the traditional accounting methods based on historical cost and the realisation principle are applied because they do not reflect the fundamental event - the transformation of biological assets (forest), which essentially changes the assets. The valuation at cost may be less reliable than the valuation at fair value because it may be the result of an incorrect

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

allocation of costs and unjustified cost estimates during different biological transformation periods. In addition, the forest "production" cycle is long and does not coincide with the reporting period, therefore, the income is recognised after a fairly long period of time, thus, the information presented in the financial statements appears to be distorted (Bohušová et al., 2012; Gabriel, Stefea, 2013; Ignat et al, 2014).

The cost of fixed assets must include all the costs incurred on the assets until the time when they can be used in the manner prescribed by the management. Dvořáková (2011) notes that all the initial and later maintenance costs should be included in the costs of developing forests. Therefore, if the forest is (re-)planted, the initial planting costs, i.e. the costs of preparation of nurseries, the purchase of forest seedlings or plants and the planting process costs should be included in the cost of forest (stands). Later, forest stands must be maintained and preserved for at least 6-7 years until a nursery is formed and forest development cutting begins. During this period, the enterprise incurs the costs of clearing the earth covering the stands, the removal of overgrowing herbaceous plants, trees and shrubs, surface water drainage, the costs of reforestation of targeted tree species, as well as protection against pests and fungal diseases, rodents, beasts, mechanical damage and similar costs. In the case of forests, the costs that are necessary for a forest to grow and used in a way the management has projected, should also be included in the cost of the forest. But the costs of later maintenance, incurred over decades, during which the company can already earn revenue from harvesting, should be treated differently. According to Dvořáková (2011), mature trees do not necessarily have to be felled right away, but felling may take place much later, for example, upon the demand of customers, when the timber meets certain qualitative characteristics or the general parameters set by the wood industry. Therefore, a reasonable question arises: which event or indicator should be considered as the final moment of the forest costs capitalisation period?

The depreciation calculation is another key issue directly related to the use of cost method for forest accounting. The accounting standards require the fixed assets, accounted for at costs, to be depreciated, while the exception applies only to land as an asset of an unlimited useful life. However, there is a concern about the suitability of the depreciation concept to forestry accounting: the depreciation calculation is a reflection of the gradual deterioration of physical wealth and, at the same time, a decrease in value. Meanwhile, the value of forests that are being developed is not decreasing, on the contrary, it is continuously increasing and the physical properties of forests are improving. Thus, the depreciation calculation does not fully reflect the value changes impacted by forest biotransformation and the dynamics of the process of obtaining economic benefits. The concept of depreciation is appropriate in accounting of bearer plants, but the essential difference should be emphasised – according to the timetable for economic benefits, bearer plants are more similar to fixed tangible assets where initially significant costs are incurred, but later such assets are used continuously and generate annual economic benefits, i.e. the harvest. When such bearer plants mature, their biological transformation no longer matters for gaining future economic benefits, and their valuation at fair value would only distort the financial information of entities (Aryanto, 2011; Damian et al., 2014; Bohušová, Svoboda 2016). The cost accounting of bearer plants by depreciation over the time of their use is logical and reflects the processes of obtaining economic benefits, while the economic benefit of the forest, developed for harvesting and sale, is essentially obtained only once - by selling it, either standing or felled, in this case, it is impossible to identify the constant gain of the annual economic benefits and the gradual "consumption" of the asset.

According to the concept of the fair value, the forest in the balance sheet has to be presented at fair value less estimated costs to sell. However, the largest drawback of this method in the context of forest accounting is the fact that rather often the forest does not have an active market with quoted prices, therefore, diverse valuation methods are used to determine the fair value, sometimes based on quite subjective assumptions, thus, the information can be unreliable or difficult to verify. When forest is accounted at fair value, the profit and loss statement reveals the profit (loss) presented with the fair value changes as well as the costs related to forest planting, development and marketing. However, this version of the fair value model is not perfect, as the recognition of costs for

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

development and maintenance of forest stands as expenses of the reporting period triggers the revenue-expenditure asymmetry: during the first year of forest development, when most of the expenditure on forest development and maintenance incurred, the fair value of the stands is insignificant and a significant gain in the revenue is unlikely. In turn, relevant changes in the fair value of the forest are taking place, so the revenue, as a result of the increase in fair value, is presented in the profit and loss statement much later, when the expenditure of maintenance of the stands are decreasing. However, emphasis should be laid on the fact that neither the national nor international accounting standards contain mandatory requirements for the biological assets to be recognised as expenses during the reporting period, therefore, such costs could be capitalised.

So far, many authors have criticised the use of fair value for forest accounting and pointed out to significant shortcomings of this approach. Fischer & Marsh (2013) claim that, before IAS 41 *Agriculture* entered into force, the biological property accounting practices were based on historical cost: this practice was concrete, verifiable and understandable, while the use of fair value contradicts the main accounting principles, the financial statements are based on estimates and opinions rather than on evidence. The fair value of a biological asset at the balance sheet date may not be related to the price at which the asset will be sold. Therefore, there is no reason to measure that asset at its fair value (Fischer, Marsh, 2013). It should be recognised that forests most commonly do not have quoted prices in the active market, so their fair value is determined on the basis of certain valuation methodologies and, in some cases, on quite subjective assumptions. However, objections can as well be made to the following claim - the cost-based forest accounting practices are more appropriate: the evaluation at historical cost does not reflect the biological transformation of the forest, while the cost calculation itself can easily become the object of manipulation to managers. Although it can be verified, it is not necessarily objective and fair.

Herbohn (2009) criticised the forest accounting and valuations at fair value emphasising that the determination of the fair value of a forest is a very subjective process that creates favourable conditions for manipulation, while the possibility of using different valuation methods makes the evaluations incomparable. According to Jöbstl (2009 b), it is difficult to choose the appropriate forest valuation method, and the determination of its fair value poses a problem of predicting the future production prices and activity volumes. Tzcupke (2009) argues that the consequence of deploying different approaches is the incomparable outcome of the performance of enterprises. Elad & Herbohn (2011) emphasise that the costs of applying fair value in the accounting of biological assets exceed the informational benefits, increase fluctuations in the revenue or the disclosures in the explanatory notes provided by different enterprises are incomparable. Most enterprises opting to use the fair value method do not disclose the information about fair value determination methods and assumptions in the notes, thus the comparability and relevance of financial information to users is reduced. But enterprises who use accounting at cost approach, do not disclose data on their formation as well (Elad, Herbohn, 2011; Goncalves, Lopes, 2014). Goncalves & Lopes (2014) point out that mandatory information on biological assets is properly disclosed only by large enterprises with a significant comparative weight of biological assets. Meanwhile, Elad (2004), Herbohn (2009) emphasise another disadvantage in using the fair value method: recognising a fair value change in the profit and loss account/statement distorts the actual results of the performance of an enterprise, while the prior recognition of a fair value change in the revenue may result in erroneous profit distribution decisions and false interpretations of financial ratios. According to Fischer & Marsh (2013), Stárová et. al (2016), the application of the fair value method may lead to the publication of dividends that are not based on the required cash flows. However, the disclosure of unrealised (future) forest and timber profits gives users more relevant and timely information that is beneficial in assessing their investment and management work (Herbohn, 2009).

Despite the criticism and skepticism expressed by some authors about the fair value forest accounting, many of scholars acknowledge that the use of the concept of fair value enables forest enterprises to present “true and fair view” in their financial statements. Stárová et al. (2016) claims that the widespread cost-based forest accounting practices do not adequately reflect forests in the financial statements, so *de facto* accounting does not fulfill its

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

main function of providing beneficial information to the users. The main factor that determines the change (increase) of forest value is its biological transformation over a long period of growth, which can only be reflected by applying a fair value method. Meanwhile, the cost method does not disclose the true financial status of forestry enterprises, since forest development and maintenance costs are not a key factor in increasing the value of the forest and those costs, being linked to the amount of the unsustainable quality production identified only after felling the trees, cannot be allocated precisely (Dvořáková, 2011).

Epstein and Jermakowicz (2010) emphasise that forests, like some other plants, have a very long cycle of production, which determines the need to record changes in their fair value and to show them in the profit and loss account for each reporting period. Otherwise, the information would be distorted because, in applying the cost method, the revenue from such an asset would only be shown in the profit and loss account for a certain rather long period of time, which would not adequately reflect the enterprise's performance. It has to be accepted that each phase of the forest biological transformation process is important and influences later economic benefits, while the cost method does not reveal the relationship between the forest biotransformation and the future economic benefits. However, the requirement to valuate forests at fair value can be a significant burden for enterprises, especially if they prepare interim financial statements. It is also worth mentioning that forest accounting at fair value is not consistent with the valuation of other assets (e.g. inventory, receivables accounted for at cost).

3. Methodology of the research of forest financial accounting practice in Lithuania

To make reasonable economic decisions, the users of financial reports need to have access to the financial information which must be relevant, reliable, comparable, validated, timely and understandable (Conceptual Framework for ..., 2015). Kaya (2013) points out the contradiction between the concepts of fair value and cost accounting which is essentially reflected in the incompatibility of the relevance and the reliability of the information, the two fundamental qualitative characteristics of financial information. In this context, special importance should be laid on the characteristic of comparability of information that can be implemented in forestry enterprises through the unified principles of recognition, classification, accounting and evaluation of forests. Only then it is possible to compare the financial status and performance of different forestry enterprises, analyse the real financial indicators of these enterprises, evaluate the efficiency of their operations and adopt rational management, investment and other economic decisions. This standpoint has posed the need to investigate the current practice of financial accounting of forest enterprises in Lithuania, which, can be diverse in the country due to a lack of regulation in this area.

In order to investigate the possibilities of selecting and applying forestry accounting methods in accounting practice, at the first stage of the research the method of the document content analysis was applied. The major focus of the document content analysis is the official legal documents of a high level of information reliability, in this case, the International Financial Reporting Standards (IFRS), approved by the EU Commission and Business Accounting Standards (BAS) approved by the Ministry of Finance of the Republic of Lithuania, that regulate forestry accounting. The document content analysis was performed by applying a traditional mechanism for understanding the document text.

At the second stage, the research was focusing on the forestry accounting practices gained by the Lithuanian forestry enterprises. The analysis was carried out into the accounting policies of these enterprises, i.e. the survey participants were chief accountants of forestry enterprises – the persons responsible for the formation and application of the accounting policy in their enterprise. The population of the research involved the enterprises engaged in forestry activities in Lithuania, except for legal entities of unlimited civil liability that, according to the Law on Corporate Financial Reporting, are not required to compile financial statements or apply the accounting

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

standards. The research population had a finite and known number of objects. According to the information provided by the Department of Statistics of the Republic of Lithuania, at the beginning of 2016, the number of enterprises attributed to the category of activities "Forest tree growing and other forestry activities" was as follows: 216 enterprises, of which 25 individual enterprises and 42 state forest enterprises. The latter were eliminated from the survey in line with the provisions of the Law on Forests of the Republic of Lithuania, as their accounting procedures do not include the value of forest land and forest - they do not perform the balance forest financial accounting. Therefore, the final population of the survey comprised 149 enterprises. In terms of the determination of the sample, a simple random sampling was used and a minimum sample size (n_{min}) which would provide a satisfactory reliability of the survey was calculated according to the formula proposed by Kardelis (2016) [1]:

$$n = \frac{Z^2 x\ SN^2}{\Delta^2 + \frac{Z^2 \cdot SN^2}{N}} \qquad [1]$$

n - number of cases in the sample
Z – coefficient from the Student's Distribution Tables (1.96 for a 95% confidence interval and 1.645 for a 90% confidence interval),
SN – standard deviation (without data on the prevalence of the phenomenon and without a trial, with the most unfavourable option being 50)
Δ – maximum permissible inaccuracy (in social studies it can vary up to 10%)
N – population size

According to the formula [1], having selected the standardised value of normal distribution by 95%, the deviation error of 10%, permissible in social research, with a population size of 149 enterprises, the estimated minimum sample was 58 respondents. The questionnaire survey was carried out from August through October 2016. The questionnaires were sent to respondents by e-mail. In all, 62 respondents (42%) completed questionnaires, i.e. the minimum projected sample size was reached. The structure of the questionnaire submitted to the respondents is presented in Figure 1.

Questions 1- 7	• General qualification questions
Questions 8-14	• Recognition of forests as assets and forest classification in accounting
Questions 15-17	• Measuring forest acquisition costs
Questions 18 - 25	• Forest accounting and valuation methods, disclosures used in practice
Questions 26-27	• Forest accounting and tax regulation compatibility aspects
Questions 28-31	• Area of the need for a forest financial accounting model

Fig. 1. Questionnaire structure
Source: Compiled by author

The general classification questions included in the questionnaire, related to the legal form and size of the enterprise, the accounting standards applied, the size of the forest managed, have enabled to identify the impact of accounting standards and the size of the company on the forest recognition, classification, accounting practices

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

and the accounting information amount disclosed to the potential users of the accounting information. The questions raised on recognition of forests as assets and forest classification in accounting aimed at investigating the application of balance and off-balance forest financial accounting model in the enterprises under analysis and aspects of forest recognition as an asset. The questions about the forest classification provided conditions for obtaining information on forest (stands) and forest land assigned to categories of fixed tangible assets, biological assets, inventory and the distribution pattern of these categories in the population, as well as the options for choosing the accounting methods used. The aim of identifying the cost of forest acquisition was to determine the costs that forestry enterprises add to the cost of the forest (stands) and the problem areas of the cost identification. The questions about the forest accounting and valuation methods used, were targeted at disclosing the prevailing forest accounting practices, problems and the extent of the disclosure of information about forests in explanatory notes. The area of the need for financial accounting model for forests managed by business enterprises, intended to investigate the opinion of the chief accountants of forestry enterprises on the establishment of a uniform financial accounting model for forests and its application in diverse size private forestry enterprises and state forest enterprises.

The survey data processing was carried out by the specialised statistical software - IBM SPSS Statistics. Depending on the purpose of the research, the analysis of frequency distribution was conducted to assess the assignation of forests to a certain category of assets, acquisition cost structure, diverse forest accounting and valuation methods, and the need for a forest financial accounting model.

4. Results of the research into forest financial accounting practices in private Lithuanian forestry enterprises

The analysis of the content of the accounting regulations - national and international accounting standards - showed that the private forestry enterprises in Lithuania are likely to be confronted with the uncertainty with regard to the forest accounting principles and process in accounting regulations. The IFRS specify the general principles of presentation of forest and forest land in the financial statements - the stands are accounted for in accordance with IAS 41 *Agriculture*, which is applied over the period of harvesting to account for the biological assets (stands) and agricultural production (roundwood, harvested from stands). In accordance with IAS 41 forests (stands) at initial recognition and at each balance sheet date must be measured at fair value less estimated costs to sell, which must be determined on the basis of the active market, or, if not, using other methods for determining fair value. The profit or loss impacted by the changes in the fair value of a forest must be included in the profit or loss for the reporting period in which they have generated (Commission Regulation ..., 2008). Nevertheless, most Lithuanian business enterprises manage their accounts and prepare financial statements in accordance with the Business Accounting Standards (BAS) in which the financial accounting of forests is unspecified: BAS 12 "Non-current tangible assets" provides that the standard does not apply to the accounting of forest land and forest resources managed by state forest enterprises in accordance with right of trust, therefore, it can be assumed that other forestry enterprises must use BAS 12 and forest accounting at cost or revaluation model. On the other hand, the same standard stipulates that BAS 12 does not apply to the accounting of assets where that asset is the main business of the enterprise and is subject to BAS 9 Inventories. In fact, forest (stands) of forestry enterprises are acquired or developed for sale, therefore, they could be accounted for in accordance with the provisions of the standard in terms of cost (Verslo apskaitos…, 2015). Nevertheless, neither the standard nor its methodological recommendations define the accounting peculiarities for this specific asset. In turn, BAS 17 Biological Assets which provides for the accounting of biological assets at cost or fair value, applies to the accounting of biological assets used in agricultural activities but does not apply to the accounting of biological assets used in non-agricultural activities, therefore, the definition of agricultural activity does not include forestry activities. Thus, it can be concluded that the forests managed by the private Lithuanian forestry enterprises can be accounted for using any forest financial accounting system that is suitable for them, which automatically leads to the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

incomparability of the information provided in the financial statements, the incomparability of the indicators used for the performance evaluation, poses doubts on the correct reflection of the enterprise's performance in the financial statements.

Of all the enterprises involved in the second phase of the research (survey), 57 were Ltd. or joint stock companies (91.94%), 4 – limited partnerships (6.45%) and one (1.61%) agricultural company. According to the classification of the size of enterprises specified by the Directive 2013/34 / EU of the European Parliament and of the Council, 45.16 per cent of the enterprises surveyed were small undertakings, the smaller part of enterprises (41.94%) were micro undertakings, the remaining 12.9% consisted of medium-sized private forestry undertakings. The data analysis revealed that, regardless of the size of enterprises, the accounting for all the enterprises was exclusively carried out and the financial statements were prepared in accordance with national Business Accounting Standards, and the majority of the chief accountants of the surveyed enterprises neither classify the activities of their companies as agricultural activities, nor apply the basic BAS 17, therefore, contrary to the widespread international accounting practice, do not classify the forest as biological assets. Although only forestry enterprises were questioned, 4 of the participating undertakings did not posess forests, therefore, did not apply forestry accounting policies.

The research showed that the Lithuanian private forestry enterprises apply balance accounting for acquired forests, but even 34.5 percent undertakings do not capitalise forest (re)planting costs and consequently don't recognise them as assets, but allocate the incurred costs to the expences of the reporting period. Therefore, it can be stated that a significant difference can be observed among the results and financial indicators provided by the companies involved in the same activities. An important area in terms of the comparability of financial information is the assignment of stands to a certain category of assets, since it affects later accounting of assets, i.e. optional accounting and valuation methods. The results of the survey revealed different practices of companies in this area (see Fig. 2): stands are most commonly classified as inventories (68.96% of respondents) then as fixed tangible assets (29.31%).

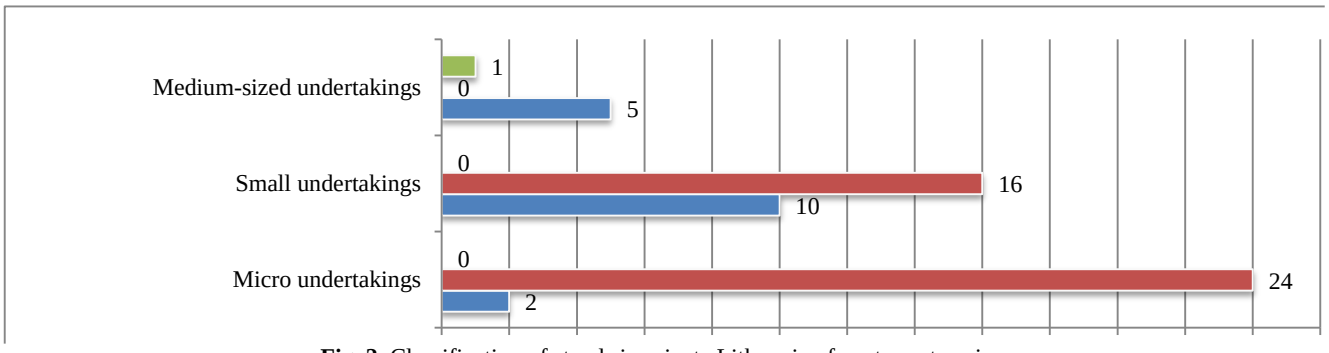


Fig. 2. Classification of stands in private Lithuanian forestry enterprises
Source: Compiled by author (based of survey results)

This distribution of the classification of stands has largely determined the choice of accounting methods used for forestry accounting: all respondents unambiguously indicated the *cost method* used, i.e. stands are presented at enterprise's balance sheet at acquisition cost minus the cost of felled stands, depreciation for forests is not calculated. This fact reflects the uncertainty of regulation in accounting for stands observed in the standards in forestry accounting. Also, it reflects an attempt of corporate accountants to use most common and simpler accounting methods.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

In response to the forest registration in accounting questions, all the respondents indicate that the acquired or (re)planted forest is recorded at the acquisition cost which takes into account quite different costs associated with acquisition, planting and maintenance (Figure 3). All the respondents unanimously (98.28 %) point out that the forest purchase price is included in the forest acquisition costs, except for one respondent who indicates that the enterprise does not possess purchased forest, but owns a planted forest. Meanwhile, in only 65.5% of the surveyed enterprises the cost of forest includes forest stands or seedlings and afforestation costs, 60.3% - afforestation site preparation costs. 51.7% of corporate accountants claim that acquisition costs include acquisition taxes, however, these taxes are unlikely to be significant, therefore, do not significantly affect the enterprise's performance results. It should be noted that only 44.8% of the respondents indicate that forest costs also comprise forest maintenance until maturity, while 36.2% include the maintenance costs until felling.

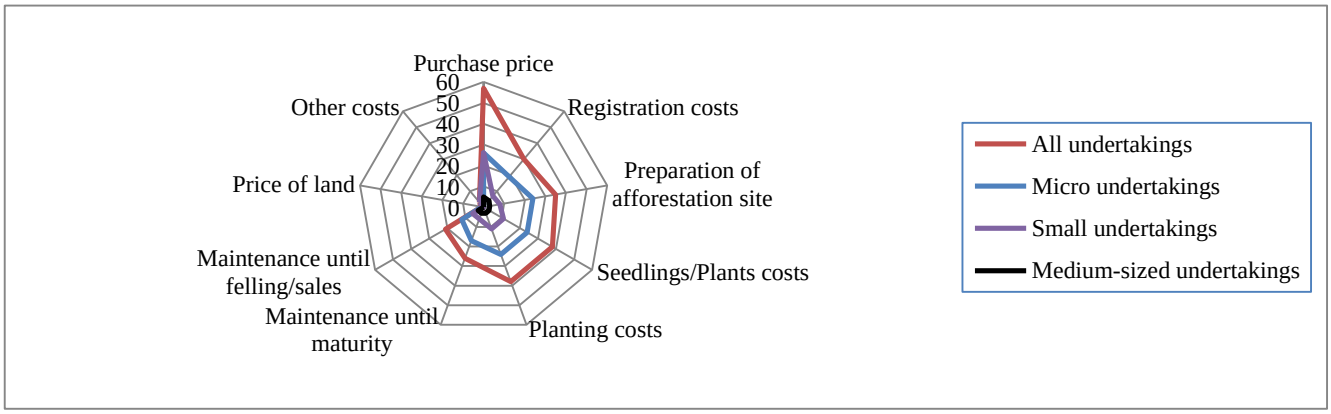


Fig. 3. Types of costs included in forest cost
Source: compiled by authors (based on survey results)

The costs for the maintenance until maturity and felling cover a relatively significant part of the costs of forestry enterprises, therefore, their capitalisation or, conversely, the inclusion in the expences of the reporting period can have a significant impact on the corporate financial performance indices. Thus, it can be argued that the accounting policies of private forestry companies are not harmonised in this respect and the financial information may be incomparable. It is assumed that smaller companies tend to apply simpler accounting rules. However, after assigning the forest costs to cost according to the size of the enterprise, we obtained an unexpected outcome: even 92.3 percent of micro enterprises assign the expenditures of afforestation, site preparation, the purchase of forest seedlings or sprouts, their planting costs to the cost of stands, while these costs are capitalised in only 50% of medium and in 42.3 percent of small enterprises. A similar trend has also been observed in the forest accounting for subsequent expenditures: even 65.38 percent of micro enterprises assign maintenance until maturity costs to the cost of stands, while they are capitalised in only 50% of medium-sized enterprises and 23.1% of small enterprises, which suggests that the general accounting principles in Lithuania are more accurately applied namely by micro forestry enterprises.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

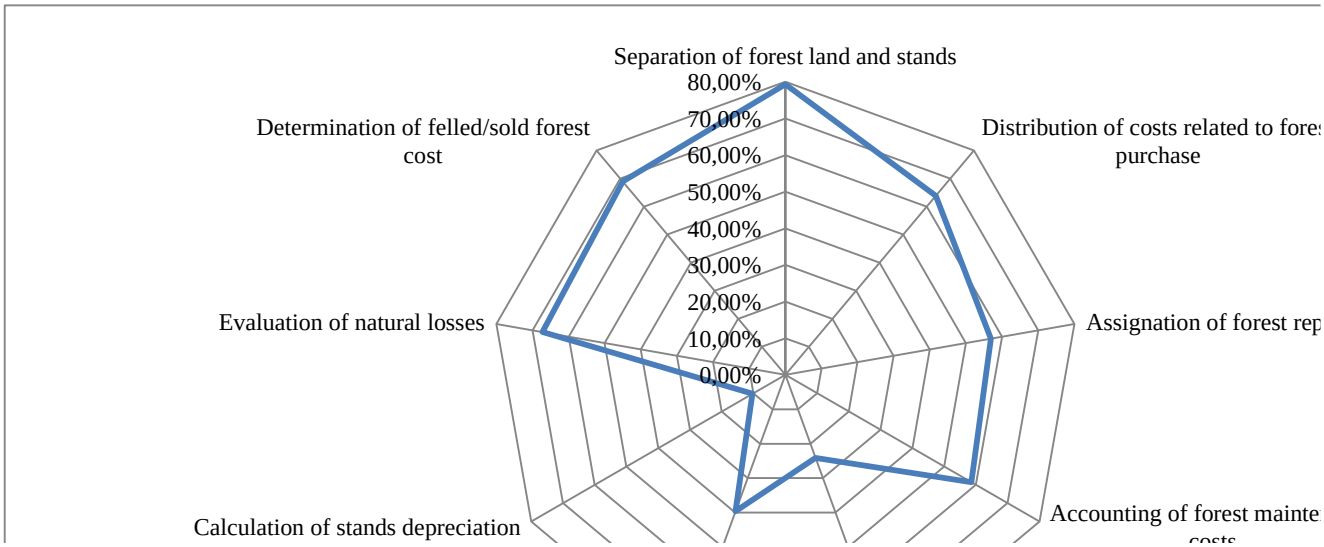


Fig. 4. Problem areas of forest acquisition cost and accounting after initial recognition
Source: compiled by authors (based on survey results)

In terms of the problem areas arising in determining the forest (stands) acquisition costs and accounting after initial recognition, almost all the respondents identified a range of problems shown in Figure 4. According to most of the respondents, it is difficult to separate the value of forest land and stands when buying a forest for a common price and in such cases some enterprises apply their own methodologies. In the opinion of 63.8% of the respondents, uncertainties arise when assigning forest purchase costs to the value of assets or expenses, while 56.9% of the subjects pointed out the ambiguous classification of reforestation costs. After conducting the analysis of the problem areas of forest accounting after the initial recognition, the most relevant areas were identified: natural losses (pests, fires, etc.) and the determination of costs of felled forest or costs of standing forest sale, while more conceptual areas like the interpretation of development costs, the use of valuation methods for the forest were identified as less relevant. Moreover, it should be noted that 24.1% of the respondents indicated that they encountered problems in determining the fair value of the stands. However, given that all the accounting for the enterprise's forest was carried out at cost, it is probable that the determination of the fair value of the forest is not relevant to its presentation in the financial statements, but for other reasons (for determining the sale price of the forest, etc.). Summarising the identified problem areas, it can be argued that they are related to the shortcomings of the forest accounting regulation (conceptual and more specific technical), which were determined by the analysis of the national and international accounting regulations.

The detail level of the regulation of financial accounting is closely linked to the requirements of disclosing additional information about the activities of the enterprise in the explanatory notes, however, it is universally accepted that if any area is not regulated (insufficiently regulated) by accounting standards, the enterprises themselves should disclose the information related to this area in the notes so that the users understand the data included in the financial statements. After identifying the insufficient forest finance accounting regulation, the respondents were asked to reveal how much information about managed forest companies provide in the notes (see Fig 5). The results of the survey revealed that the respondents behaved differently: only 46.6% of the surveyed chief accountants indicated that they provide explanatory notes with not only the accounting information specified by the accounting standards, but also supplementary information that would help the users of the financial statements to better understand the company's financial information. However, 19% the respondents

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

claimed they disclose only the necessary required information, while even 34.5% of the subjects marked that in the notes, they provide no information on the managed forests.

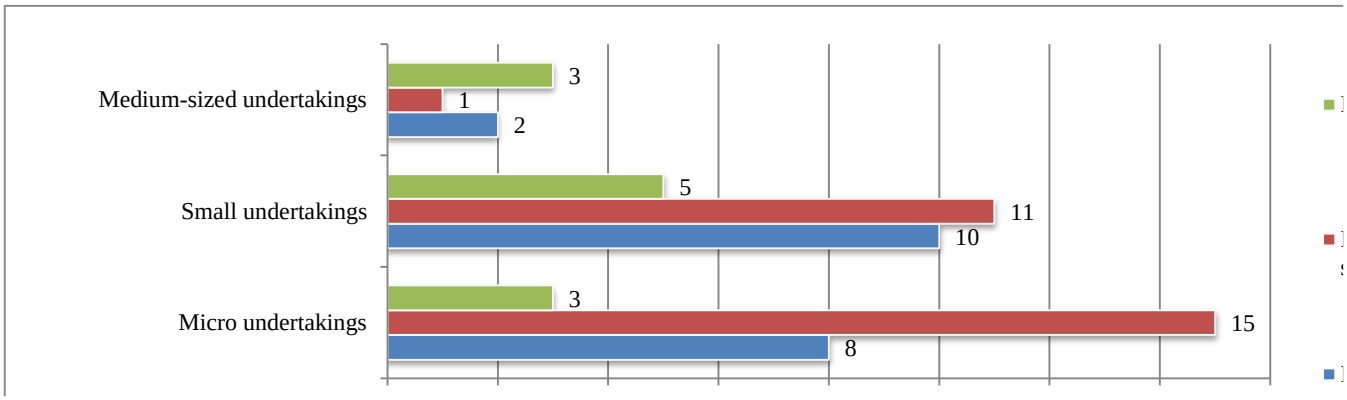


Fig. 5. Disclosure of information on forests in explanatory notes
Source: compiled by the author (based on survey results)

It should be emphasised that such a situation implies a potentially false interpretation of the financial data on the corporate operations in the context of insufficient regulation of accounting of forests and different accounting practices, i.e. the financial information may be incomprehensible to users. After the respondents were asked to express their opinion on the need for a forest financial accounting model that defines the classification, valuation and accounting principles of forests (stands), 98.39% of the respondents agreed with the necessity of the existence of such a model. However, the respondents' viewpoints on the unification of the accounting methods for small and large enterprises, private forestry enterprises and state forest enterprises were slightly unexpected (see Figure 6).

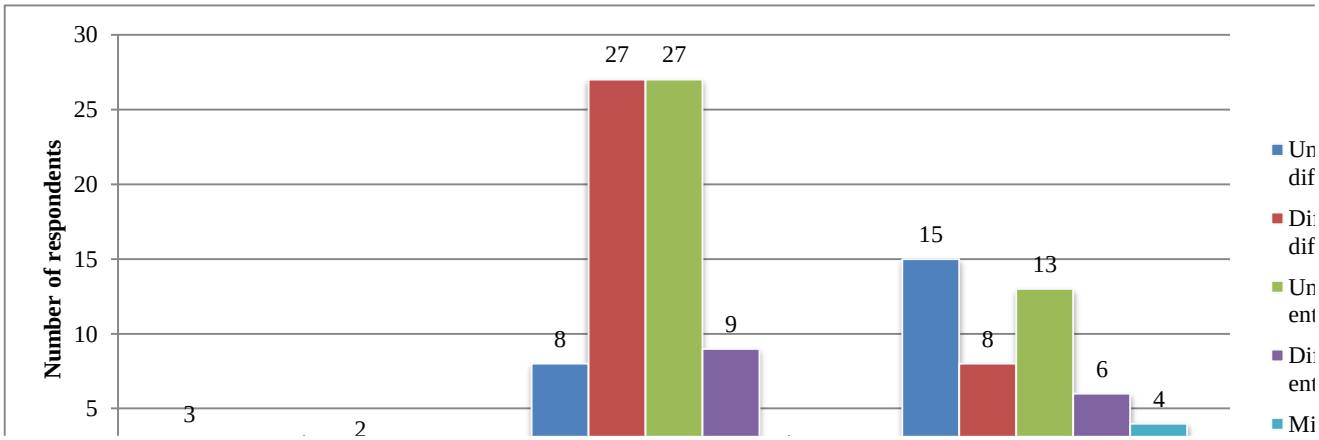


Fig. 6. Respondents' opinion on the unification of forest accounting
Source: compiled by author (based on survey results)

According to the majority of respondents (56.45%), the financial accounting rules for forests should be different for small and large enterprises, because of "the differences in the scope of activities", "more complicated accounting rules would increase the costs for small enterprises", "small enterprises have limited financial possibilities", "this isn't relevant for small scale businesses", "only the tax inspectorate is interested in the financial statements of small enterprises". It should be noted that the respondents' arguments are fully justified: small undertakings often have a rather narrow circle of financial reporting information users, and the users

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

themselves (owners, who are usually managers of these companies, banks, tax administrators, statistics institutions) have the opportunity to demand additional data from the company, so complicated accounting rules not only hardly justify, but also increase the costs of enterprises, and, if applied incorrectly, may distort information about the company's activities. However, 41.94% of the respondents believe that forest accounting rules should be the same for companies of different sizes, because "there is no difference what size emterprise acquires the forest", 'there must be uniform legal provisions for all", "market conditions are the same for all", "accounting requirements must be the same for transparency". However, it should be noted that, unlike small ones, large companies have a much wider range of financial information users, and some of these users (owners who are not company managers, potential investors, non-financial creditors, community, etc.) can only receive information about the company's activities from financial statements. Therefore, more complex accounting methods and additional information disclosures are inevitable. The respondents' opinions were also diverse in relation to the unification of forestry accounting rules of state and private forest enterprises: 66.13% of the respondents believe that the forest accounting provisions should be the same in the private forestry enterprises and state forest enterprises, however, 27.42% claim that the accounting rules must be different. In assessing the respondents' arguments, it should be emphasised that the principles of formation of an enterprise accounting system can be influenced by the nature and extent of the activity, but not by the legal status of the company.

5. The model of forest accounting at cost for micro and small enterprises

A survey of the chief accountants of the Lithuanian private forestry enterprises revealed that none of the investigated enterprises applied fair value accounting methods regardless of their informational benefits to users. The fact of ignoring the fair value can partly be explained by the fact that 68.96% of the surveyed enterprises classify the stands into the category of inventories subject to accounting for the cost method. However, the enterprises that assign stands to fixed assets did not apply fair value-based methods too.

The use of the fair value concept for forest accounting is complicated due to the annual determination of forest fair value and could be proposed for medium and large local, especially international and listed forestry enterprises that are important for the public and/or the community, for those entities who have a large number of financial information users and sufficient financial and intellectual resources to properly implement this method. Meanwhile, the cost method can be applied to micro and small undertakings, which usually have lower financial and qualification possibilities, but are not so significant for the public because of their own size and have a smaller number of information users. This proposal is based on a changing view on the usefulness of accounting information. In the second half of the 20th century, the prevailing opinion on small companies was that they did not significantly differ from the large ones and should be subject to the same accounting requirements. In the 21st century it has been recognised that the needs of small and large enterprises differ, and small companies should not use complicated accounting models, i.e. they must be enabled to simplify their accounting. It should be noted that more than half of the interviewed chief accountants of the private Lithuanian forestry enterprises supported this view.

The results of the survey revealed that the majority of small (61.5 percent) and micro (92.3 percent) Lithuanian private forestry enterprises classify forests (stands) as inventory. However, such a classification raises serious doubts: although the forest is being developed for sale, but the time of its development is usually very long, it generates the revenue from developing felling, and the assets do not feature liquidity characteristic of short-term assets, especially if more than ten years are ahead until the maturity of the stands. Therefore, we tend to support the opinion of Wallner (2009), Jöbstl (2009), Grege - Staltmane (2010), Dvořáková (2011), Zamula and Shavurska (2015): in order to provide "true and fair view" of the financial statements, the forest under development should be classified as fixed (long–term) assets. In terms of the classification of stands according to the nature of the assets, the definition of biological assets in IAS 41 should be taken into account: biological

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

assets are plants and animals used in agricultural (including forestry) activities (Commission Regulation ..., 2008). Thus, it is advisable that the developing forest for sale, either felled or standing, should be classified as fixed biological asset until its felling (sale).

The research pointed out the essential problem of enterprises applying accounting at cost method: cost estimates for different companies assign different costs to the cost of stands, so the information about forests is not comparable. If only the initial costs were included in the (re)planted forest cost, it would be artificially reduced, as the costs of subsequent maintenance are a prerequisite for the further forest development and preparation for sale. The cost determined in this way would also significantly differ from the purchase price of a similar (of the same age and species) forest, which would be considered as the cost of the later acquired forest. Therefore, we suggest that forest (stands) cost include not only the initial costs, but also the subsequent direct costs of development and maintenance (thinning, development felling, replanting, etc.), which are necessary and incurred up to the time when the forest reaches the age of maturity and will be sold or felled. However, subsequent costs linked indirectly to forest development (animal and insect control, forest roads construction, fire protection, forest management personnel) that are difficult to distribute to different units of account, as well as sales costs to be recognised as expenses in the reporting period, should not be included in cost. Meanwhile, the costs of preparing for sale (felling, cutting, extraction, hauling) should be credited to the cost of wood production (inventory), but not forest (biological assets) cost.

The analysis of scientific literature with respect to the application of cost method in forest accounting, as well as the survey of chief accountants of forest enterprises suggest that the classic calculation of depreciation for a forest is an improper procedure in order to reflect the process of forest development and the schedule for obtaining an economic benefit. Therefore, consideration should be given to the alternative method in assigning forest value – depletion, i.e. a method of accounting that is commonly used to distribute the costs of natural resources (oil, gas, etc.) during the period of extraction of those resources. Depletion is very similar to depreciation, especially if the production method is used in calculating the depreciation, but, unlike depreciation, which is essentially the distribution of the costs of acquisition of fixed tangible assets during its useful life, while depletion reflects the actual (physical) consumption of natural resources (extraction). Forest depletion may be defined as the recognition of planting and other capitalised development and maintenance costs during the forest development period as the expenses of the reporting period when the forest is sold either standing or lost, or added to the cost of wood (production) after forest felling. The depletion (D) amount for the reporting period can be calculated according to the formula [2]:

$$D = \frac{I}{(A + P)} x P \qquad [2]$$

I - capitalised costs incurred of stands, minus amounts for forest depletion in previous years;
A - volume of timber (m3) expected to be produced in the future by stands existing/growing at the end of the reporting period
P - volume (m3) of timber (sold stands) received during the reporting period

Depletion should be calculated for each reporting period, and the estimated amount may vary each year due to the quantity of the sold (felled) stands as well as changes in variables *I* and *A*. This method of calculating depletion eliminates the complications triggered by the cost method applied, also the forest financial accounting is allowed to apply the classic methodology for fixed assets accounting. The diagram representing the process of applying the cost model to the financial accounting of forests is shown in Figure 7.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

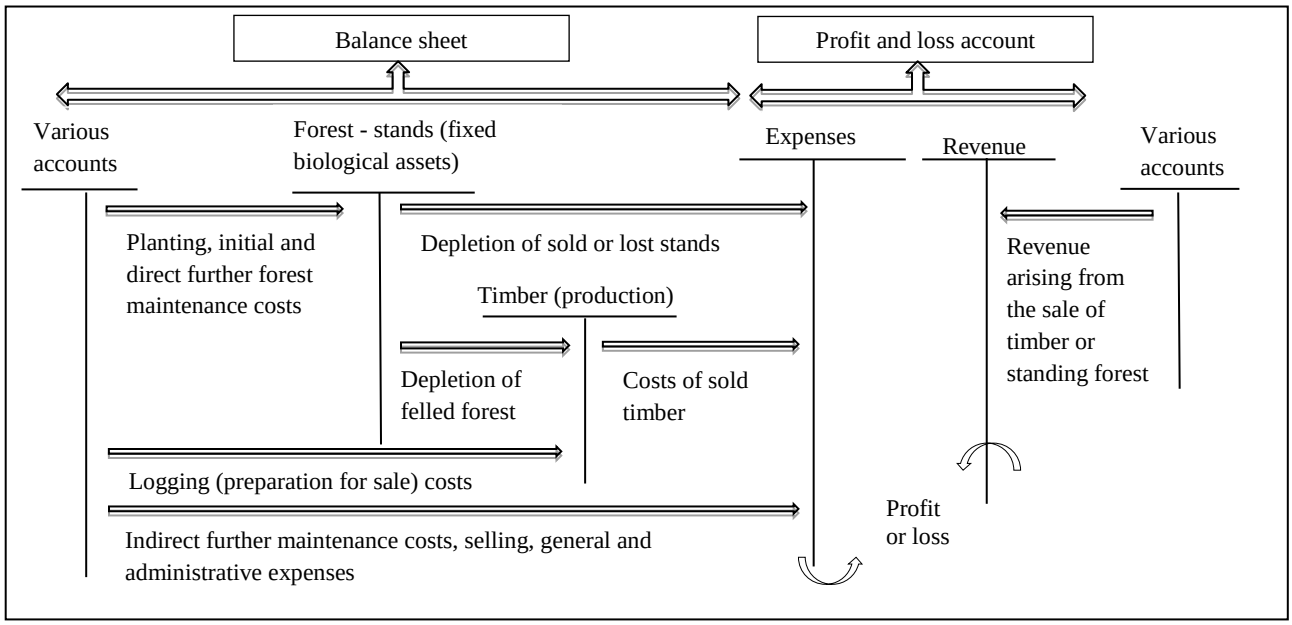


Fig. 7. A modified method of forest financial accounting at cost
Source: Compiled by the author

A presented model of forest financial accounting at cost eliminates the essential shortcomings of the cost method: depletion, unlike depreciation, is not related to the "useful time" of a forest, enables us to take into account the continuously changing forest cost, therefore, provides a solution to the end of costs capitalisation. Also, facilitates the application of the methodologically correct method of a systematic write-off of fixed assets.

Conclusions

Accounting at fair value allows to present forests in the balance sheet at fair value less estimated costs to sell, which is considerably more relevant information to the users, in particular, regarding long-term prospects of the enterprise and enables to reflect not only the forest biological transformation, but also the impact of market circumstances. The main disadvantage of accounting at fair value is the fact, that, as a rule, there is no active forest market with quoted prices and the fair value is determined using different methods and assumptions, as a result of which the information may become incomparable and unreliable. When forestry enterprises use cost-based accounting methods, their financial statements provide reliable and verifiable information, there is no need to carry out a periodic determination of the fair value of a forest, which is a time-consuming procedure demanding additional worktime and (or) financial resources. However, the historical cost concept, which is traditionally clear, understandable and easily implemented, in the case of forest accounting poses the following complications: 1) forest reforestation and follow-up maintenance costs distribution and determination of the end point of capitalisation and 2) the selection of a systematic write-off mode after recognition of a forest as a fixed (long-term) asset.

The results of the empirical survey of forest accounting policies and practices used by the forestry enterprises in Lithuania show that the financial accounting for forests is different, thus the corporate financial information is incomparable. Although all the surveyed companies apply the Lithuanian Business Accounting Standards, their forests are exclusively accounted for at cost, in other areas the essential differences have been identified. Most of the enterprises capitalise the afforestation (reforestation) costs, but a significant number of them assign these costs

to the expenses of the reporting period. Significant differences were identified in the areas of classification of stands as well as in forest cost determination, accounting of maintenance and restoration expenses. In the context of uncertain accounting processes, it is important to provide additional information to users, yet, more than half of the surveyed enterprises do not provide any or additional information on forests in their explanatory notes. The results of the survey reveal that the enterprises do not opt to use fair value accounting methods, adapted in global practice, in order to provide users with more relevant information in their financial statements.

A model of forest accounting at cost was proposed to micro and small forestry enterprises. According to the model the forest acquisition cost should include not only the planting, initial forest maintenance costs, but also the direct further forest maintenance costs, incurred until the forest (stands) sale or felling moment, however, the indirect further forest development costs, related to the forest maintenance should not be included. To systematically write-off the stands, the depletion method is suggested, according to which the cost of stands should be included in timber cost after felling or should be recognised as expenses after the forest (stands) or part of it is sold.

References

Alexander, D.; Fasiello, R. 2014. Valore reale, fair value and the business model: was besta best after all? Proceedings of the 9 th *International Conference on Accounting and Management Information System AMIS*. June 11-12, Bucharest, Romania, p. 703-723.

Aryanto, Y.H. 2011. Theoretical Failure of IAS 41: Agriculture. *SSRN Electronic Journal*. http://dx.doi.org/10.2139/ssrn.180841

Bohušová, H.; Svoboda, P. 2016. Biological Assets: In What Way should be Measured by SMEs? *Procedia - Social and Behavioral Sciences.* Volume 220, No. 31, p. 62–69. https://doi.org/10.1016/j.sbspro.2016.05.469

Bohušová, H.; Svoboda, P.; Nerudová, D. 2012. Biological assets reporting: Is the increase in value caused by the biological transformation revenue? *Agricultural Economics* (AGRICECON) No. 58(11), p. 520-532. Retrieved from: https://www.agriculturejournals.cz/publicFiles/78750.pdf

Commission Regulation (EC) No 1126/2008, 3 November 2008 adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002 of the European Parliament and of The Council. Retrieved from: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:02008R1126-20170101&qid=1397629289404&from=EN

Conceptual Framework for Financial Reporting. Exposure Draft ED/2015/3. IFRS Foundation. Retrieved from: http://www.ifrs.org/Current-Projects/IASB-Projects/Conceptual-Framework/Documents/May%202015/ED_CF_MAY%202015.pdf

Damian, M.I.; Mănoiu, S.M.; Bonaci, C.G.; Strouhal, J. 2014. Bearer plants: Stakeholders' view on the appropriate measurement model. *Accounting and Management Information Systems*, Vol. 13, No. 4, p. 719–738.

Directive 2013/34 / EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC. Retrieved from: http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:02013L0034-20141211&from=LT

Dvořáková, D. (2011) Relevant Measurement and Accounting Models in Forestry. *The fifth international scientific conference Rural development 2011. Proceedings*, Vol 5, book 1, p. 105-110. Retrieved from: http://dspace.lzuu.lt/jspui/bitstream/1/2902/1/rural_developmen_2011_book1.pdf#page=106

Elad, C. 2004. Fair value Accounting in the Agricultural Sector: Some Implications for International Accounting Harmonization. *European Accounting Review* 31, p. 621 – 641. https://doi.org/10.1080/0963818042000216839

Elad, C.; Herbohn, K. 2011. *Implementing fair value accounting in the agricultural sector: executive summary.* Edinburgh: The Institute of Chartered Acountants of Scotland, 155 p.

Epstein, B.J.; Jermakowicz. E.K. 2010. *Interpretation and Application of International Financial Reporting Standards.* John Wiley & Sons, 1344 p.

Fischer M., Marsh T. (2013). Biological Assets: Financial Recognition and Reporting Using US and International Accounting Guidance. *Journal of Accounting and Finance*. West Palm Beach, vol. 13(2) p. 57-74. Retrieved from: https://search.proquest.com/openview/306f7a674c324a352d35507ccdcadf76/1?pq-origsite=gscholar&cbl=766330

Gabriel, N.; Stefea, P. 2013. International accounting standard 41 (IAS 41) - implication for reporting crop assets. *Agricultural Management / Lucrari Stiintifice Seria I, Management Agricol*, 15(3), p. 100-105. Retrieved from: http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=f93e876a-2aaa-449b-863c-5abe4129b596%40sessionmgr4009

Gonçalves, R.; Lopes, P. 2014. Firm-specific determinants of agricultural financial reporting. *Procedia - Social and Behavioral Sciences*, No. 110, p. 470 – 481. https://doi.org/10.1016/j.sbspro.2013.12.891

Grege – Staltmane, E. (2010). Challenges in accounting the forests - a Latvian case study. Annals of Forest Research. 53 (1), p. 51-58. doi:10.15287/afr.2010.114. Retrieved from: http://www.afrjournal.org/index.php/afr/article/view/114

Herbohn, K. 2009. A preliminary investigation of the reporting of forest assets under International Financial Reporting Standards. *Austrian Journal of Forest Science*. 126 (1/2), p. 21 – 37. Retrieved from: https://trove.nla.gov.au/work/37182109?q&versionId=49502841

Ignat, G.; Iatco K.; Ungureanu, G.; Costuleanu, C.; Athes, H. 2014. Aspects Regarding the International Accounting Standard IAS. 41 – Agriculture. *Agronomy Series of Scientific Research / Lucrari Stiintifice Seria Agronomie*. 2014, Vol. 57 Issue 2, p 257-260. Retrieved from: http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=1dbf7be0-8d6f-402f-ab45-ec94718552a7%40sessionmgr4006

Jöbstl, H. A. 2009. Can traditional forestry accounting contribute to measuring the sustainability of a forest enterprise? *Contributions to Accounting in Forestry*. Wien: Universitat fur Bodenkultur. p. 101-109. Retrieved from: http://www.wiso.boku.ac.at/fileadmin/data/H03000/H73000/H73010/ME/ME_Part4.pdf

Kardelis, K (2016) *Mokslinių tyrimų metodologija ir metodai* [Methodology and methods of research]. Mokslo ir enciklopedijų leidybos centras, 487 p.

Kaya, C. T. 2013. Fair value versus historical cost: which is actually more „fair“? *Journal of Accounting & Finance*, Issue 60, p. 127-137. Retrieved from: http://dergipark.gov.tr/download/article-file/427481

Stárová, M.; Čermáková, H.; Hlavsa, T.; Vostrovská, H.; Levá, M. 2016. Evaluation of applicability of IAS 41 – Agriculture to the valuation of growing forest stands and their accounting treatment in the Czech Republic. *Journal of Forest Science*, 62 (9), p. 429–440.: https://doi.org/10.17221/59/2016-JFS

Tzschupke, W. 2009. Forestry accounting in German state and municipal forest enterprises - recent innovations. Austrian Journal of Forest Science. 126, 1/2. p. 39 – 52. Retrieved from: http://www.boku.ac.at/cbl

Verslo apskaitos standartai ir metodinės rekomendacijos taikomi nuo 2016 m. sausio 1 d. Business accounting standards and methodological recommendations applied from 2016, 1 January. 2015. Vilnius: Vši Audito ir apskaitos tarnyba, 472 p.

Wallner, K. 2009. Fair Value Accounting of Biological Assets Regarding to IAS 41 and Emission Reduction Revenues Obtained be Silvicultural Assets: the Case of Precious Wood Groups. *Building Insights of Managerial Economics and Accounting towards Sustanamble Forest Management*, p. 167 – 177.

Zamula, I.V.; Shavurska, O.V. 2015. Accounting of forest resources in the framework of sustainable development. *Vìsnik Žitomirs'kogo Deržavnogo Tehnologìčnogo Unìversitetu. Ekonomìčnì Nauk*i, No. 3 (73), p. 18-21. Retrieved from: https://doaj.org/article/5625108f548b41558cb5374e0c7e815d

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(5)

Dr. Ramunė BUDRIONYTĖ is an Assistant Professor in the Accounting and Auditing Department at Faculty of Economics and Business Administration, Vilnius University. She is a member of the Committee of Business Accounting Standards under the Ministry of Finance of the Republic of Lithuania. Her teaching curriculum and research interest involve International Accounting Standards, Financial Accounting, Financial Analysis, Financial Reporting, Taxes.
ORCID ID: orcid.org/0000-0002-6889-5598

Dr. Lionius GAIZAUSKAS is a Professor in the Accounting and Auditing Department at the Vilnius University. His main research and teaching areas are financial and managerial accounting,financial analysis and audit.
ORCID ID: orcid.org/0000-0002-6880-5599

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

THE METHODOLOGY OF THE STATEMENT OF COMPREHENSIVE INCOME AND ITS IMPACT ON PROFITABILITY: THE CASE OF LATVIA

Inga Būmane

University of Latvia, Aspazijas Blvd 5, Riga, Latvia, LV-1050

E-mails: inga.bumane@lu.lv

Received 16 March 2018; accepted 17 May 2018; published 30 September 2018.

Abstract. The financial statements of a company are used by external users as the main source of information in order to take financially informed decisions. The author of the article has summarized the study on one of the financial statements – a statement of comprehensive income (CI statement) that enables creditors and investors to assess the process of the formation of company's profit and profitability. Purpose: on the basis of the study of the specificity of the preparation of the statement of comprehensive income to analyze and evaluate the influence of CI statement items on the profitability of Latvian companies. In order to achieve the purpose, the author has structured the research in two parts. In the first part of the article the author describes the theoretical framework of the core, type and content of CI statement and describes the components of other comprehensive income. In the second part of the article the author has analyzed the methodology for the preparation of CI statement at Latvian companies and impact of other comprehensive income on profitability. The subject of research was a sample of 26 financial statements of Latvian companies. The author applied quantitative and qualitative research methods generally accepted in economics: classification, comparative analysis and synthesis, statistical methods. The essence of research findings is that the core of items of CI statement and the division into the reclassified and not reclassified items of other comprehensive income (OCI) are important for the company`s financial result – evaluation of profit. Research showed that most of Latvian companies under research were influenced by reclassified items; besides, positively influenced - profitability ratios of ROE and ROA. The author believes that, when evaluating the profitability of assets and the equity of the company, the financial analysts shall take into account the reclassified items of OCI, and the calculations shall be performed using the modifications of ROE and ROA formulas.

Keywords: assets; comprehensive income; equity; financial statements; profitability

Reference to this paper should be made as follows: Būmane, I. 2018. The methodology of the statement of comprehensive income and its impact on profitability: the case of Latvia, *Entrepreneurship and Sustainability Issues* 6(1): 77-86. http://doi.org/10.9770/jesi.2018.6.1(6)

JEL Classifications: M41, M49

1. Introduction

The financial statements of companies are used by external users as the main information source in order to analyze, assess and forecast the companies' financial situation, results of performance, cash flow and, on the basis

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

of above mentioned, to take the financially informed decisions. Measures of profitability will be important for a variety of users. Shareholders will want to be reassured that the firm will be able to generate and sustain profits from which to distribute dividends. Banks and other lending institutions will also be interested in profitability since it will affect company`s liquidity, its capacity to finance debt and, ultimately, its ability to repay loans (O`Regan, 2007). The result of companies' annual performance – profit or losses, are disclosed in the statement of profit or loss (statement of P/L) or in the statement of comprehensive income (CI statement). It should be pointed out that historically the requirement to prepare CI statement was first applied to the US companies that for the first time prepared this financial statement in conformity with SFAS (Statement of Financial Accounting Standards) No.130 "Reporting Comprehensive Income" – requirements set for the beginning of a fiscal year after 15 December 1997 (FASB, 1997). Some years later the requirement to prepare CI statement was applied to the companies that arranged their accounting in compliance to the requirements set in the International Accounting Standard/International Financial Reporting Standard (IAS/IFRS), namely, these companies prepared CI statement for the first time in conformity with the amended IAS No.1 "Presentation of Financial Statements" for annual periods beginning on or after 1 January 2009 (IASB, 2016). The documents, regulating accounting in Latvia, provide for several requirements that only partially are in compliance with the internationally adopted regulations concerning recognition, evaluation (Bumane, Kasale, 2012). In conformity with the requirements of European Commission Regulation (EC) No.1126/2008 of 3 November 2008 "Adopting Certain IAS in accordance with Regulation (EC) No.1606/2002 of the European Parliament and of the Council", in the EU Member States (including Latvia) such separate financial statement shall be prepared since the same date, when the amended IAS No.1 came into effect, i.e., for annual periods beginning on or after 1 January 2009. Thus the CI statement for those companies in Latvia that have to prepare annual financial statements in conformity with the requirements of IAS/IFRS is a relatively new financial statement. The CI statement may be prepared by applying different methodologies (type, classification of expenses, items of other comprehensive income), therefore it is important to study the methodology of the preparation of this statement in Latvia and the influence of its items on the indicators of companies' profit. Similar study on the core and significance of CI statement has been carried out by Slovak scientists (Lapkova, Stašova, 2014), Italian scientists (Cristofaro, Falzago, 2014 and Gazzola, Amelio, 2014) and Dutch scientist (Detzen, 2016). As well as, by means of CI statement and the analysis of its items some aspects have been studied by: Chambers (2007); Dyczkowska (2009); Gad (2015); Mackenzie, Coetsee, et al. (2014); Mackevičius (2007, 2014); Mahn-Bena (2010); Prauliņš and (2012); Picker, Stanton, et al. (2016); Rankin, Stantin, et al. (2012).

The purpose of the research: on the basis of the study of the specificity of the preparation of comprehensive income statement to analyze and evaluate the influence of CI statement items on the profitability of Latvian companies. In order to achieve the purpose, the author has structured the research in two parts. In the first part of the article the author describes the theoretical framework of the core, type and content of CI statement and describes the components of other comprehensive income. In the second part of the article the author has analyzed the methodology for the preparation of CI statement at Latvian companies and impact of other comprehensive income on profitability. The subject of research was a sample of 26 financial statements of Latvian companies.
The author applied quantitative and qualitative research methods generally accepted in economics: classification, comparative analysis and synthesis, statistical methods. At the end of the article there have been presented the conclusions drawn as a result of research performed and the suggestions for the improvement of methodology used to calculate the profitability of companies.

2. Theoretical Framework

Initially, when SFAS No.130 "Reporting Comprehensive Income" was adopted in June 1997, CI statement was introduced in the companies' financial statements in the USA. The above mentioned statement replaced the Income Statement. The FASB defines the comprehensive income as "the change in equity [net assets] of a

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

business enterprise during a period from transactions and other events and circumstances from non-owner sources. It includes all changes in equity during a period except those resulting from investments by owners and distributions to owners" (FASB, 1997). Thus the aim of the preparation of such statement is "a measure of all changes in equity of an enterprise that result from recognized transactions and other economic events of the period other than transactions with owners in their capacity as owners" (FASB, 1997). Similar description of the core of CI statement is provided by IASB: "the statement of comprehensive income shall present, in addition to the profit or loss and other comprehensive income sections: (a) profit or loss (the total of income less expenses, excluding the components of other comprehensive income); (b) total other comprehensive income (items of income and expense, including reclassification adjustments, that are not recognised in profit or loss as required or permitted by other IFRSs); (c) comprehensive income for the period, being the total of profit or loss and other comprehensive income (the change in equity during a period resulting from transactions and other events, other than those changes resulting from transactions with owners in their capacity as owners) (IASB, 2016).

Having compared descriptions provided by FASB and IASB, we can draw a conclusion that the international standard provides more explanation on separate components of CI statement. With regard to IFRS No.130 "Reporting Comprehensive Income", the Dutch specialist (Detzen, 2016) states that: "From a reporting perspective, the SFAS No.130 achieved its objective and brought about transparency. However, by labeling items excluded from income as OCI, it left behind conceptual considerations and created a definitional dilemma, exacerbating the difficult sense-making of current accounting practice. That is, SFAS No.130 defined OCI accounting, not as a concept, but as a practice and, thus doing it, institutionalized it without a clear meaning".

Since for Latvia as the EU Member State are binding the requirements set in IASB, the author will emphasize the requirements set in IAS regarding the preparation of CI statement. IAS No.1 provides that an entity may present CI statement in two ways. One way - as one statement consisting of two sections: Profit or Loss (P/L) section and Other Comprehensive Income (OCI) section, and the other way – as two separate statements: Statement of P/L and the Statement of OCI Statement (see Table 1).

As we can see in Table 1, irrespective of the type of CI statement, the content of this statement is identical. The only formal difference - if CI statement is prepared as two separate statements, then the Statement of OCI starts with the item 'profit or loss for the period'. There is no also difference, when disclosing which items have affected the profit or loss for the period. Like before coming into force of the amended IAS No.1 "Presentation of Financial Statements", now the companies can choose the method for the classification of expenses: based on their nature or their function.

As a conceptual difference from the previous P/L statement, it should be pointed out that there is a new section included into the CI statement - other comprehensive income (OCI). In this section the company must show the items of income and expense, including reclassification adjustments, that are not recognised in the profit or loss as required or permitted by other IFRS. The components of other comprehensive income include: (a) changes in revaluation surplus, (b) remeasurements of defined benefit plans, (c) gains and losses arising from translating the financial statements of a foreign operation, (d) gains and losses from investments in equity instruments designated at fair value through other comprehensive income, (e) the effective portion of gains and losses on hedging instruments in a cash flow hedge and the gains and losses on hedging instruments that hedge investments in equity instruments measured at fair value through other comprehensive income, (f) for particular liabilities designated as at fair value through profit or loss, the amount of the change in fair value that is attributable to changes in the liability's credit risk, (g) changes in the value of the time value of options when separating the intrinsic value and time value of an option contract and designating as the hedging instrument only the changes in the intrinsic value, and (h) changes in the value of the forward elements of forward contracts when separating the forward element and spot element of a forward contract and designating as the hedging instrument only the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

changes in the spot element, and changes in the value of the foreign currency basis spread of a financial instrument when excluding it from the designation of that financial instrument as the hedging instrument (IASB, 2016).

Table 1. Type and Content of the Statement of Comprehensive Income

<table>
<tr><td>Two statements</td><td>One statement</td></tr>
<tr><td>1. Statement of Profit or Loss</td><td>Profit or Loss section</td></tr>
<tr><td colspan="2">Based on the nature or based on the function:
• Revenues
• Costs and Expenses arising in the course of the ordinary activities of the entity
• Gains and Losses recognized in profit or loss</td></tr>
<tr><td colspan="2">Profit or Loss for the period</td></tr>
<tr><td>2. Statement of Other Comprehensive Income</td><td rowspan="2">Other Comprehensive Income section</td></tr>
<tr><td>Profit or Loss for the period</td></tr>
<tr><td colspan="2">Grouped into those that will not be reclassified or will be reclassified subsequently to profit or loss:
• Gains and Losses not recognized in profit or loss classified by their nature
• Amounts the share of the other comprehensive income of associates and joint ventures accounted for using the equity method</td></tr>
<tr><td colspan="2">Total other comprehensive income</td></tr>
<tr><td colspan="2">Total comprehensive income for the period</td></tr>
</table>

Source: compiled by the author

Gazzola, Amelio (2014, p.175-176) state: "Basically, these are items (items of OCI - author) that are politically unpalatable to the accounting standard setters for inclusion in traditional net income because of their volatility. OCI is those expenses, gains, revenues and losses which are excluded from net income. These items usually appear in other comprehensive income when they have not yet been realized. It is believed that other comprehensive income is made to give the management a more comprehensive view of the company's financial statement. The OCI adjustments are mainly revaluations coming from the new fair-value orientation of accounting standards". Similar point of view on the core of OCI items is presented by Mackenzie B., Coetsee D. et al. (2014, 72. p.), who state that: "However, unrealized gains and losses also reflect real economic transactions and events and are of great interest to decision makers. ... Both the financial reporting entities themselves and the financial analyst community go to great lengths to identify those elements within reported income which are likely to be continuing into the future, since expected earnings and cash flows of future periods are main drivers of share prices".

In addition to this it should be mentioned that, in conformity with the requirements of IAS No.1, items of other comprehensive income shall be disclosed in two parts: items, which will not be reclassified subsequently to profit or loss, and, which will be reclassified subsequently to profit or loss. The company may present these items either: 1. as net of related tax effects, or 2. before related tax effects with one amount shown for the aggregated amount of income tax related to those items. The author of the article agrees to the point of view expressed by scientists Mackenzie B., Coetsee D. et al. (2014, 73. p.) that: "The information provided by the statement of profit or loss, relating to individual items of income and expense, as well as to the relationships between and among these items (such as the amounts reported as gross margin or profit before interest and taxes), facilitates financial analysis,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

especially that relating to the reporting entity's historical and possible future profitability. Even with the ascendancy of the statement of financial position as the premier financial statement, financial statement users will always devote considerable attention to the statement of profit or loss".

The author's point of view is that the requirement to prepare CI statement will enable the external users of financial statements, especially – creditors and investors, to obtain more complete information on the company's profit development processes.

3. The Analysis of Comprehensive Income Statement in Latvia

3.1. Research Resources and Design

In Latvia the preparation of the financial statements of companies is regulated by the law of the Republic of Latvia "Law on the Annual Financial Statements and Consolidated Financial Statements". It provides the regulation in relation to the statement of P/L structure, description and content of items, which corresponds both Directive No.2013/34/EU "On the Annual Financial Statements, Consolidated Financial Statements and Related Reports of Certain Types of Undertakings" and IAS No.1 "Presentation of Financial Statements" statement of P/L or P/L section preparation requirements. However, in both present and previous editions of this law there are criteria indicated for the companies that shall prepare their financial statements in conformity with IAS/IFRS.

In conformity with the requirements of Regulation (EC) No.1606/2002 of the European Parliament and of the Council of 19 July 2002 "On the Application of International Accounting Standards", since the year 2005 all consolidated statements of Latvian companies, if, at the balance sheet date, their transferable securities are admitted to trading on a regulated market of any EU Member State, must be prepared according to IAS/IFRS. The financial statements shall be prepared in conformity with IAS/IFRS also by financial sector (banks, insurers, leasing companies etc.) and companies the transferable securities of which are included into the official list of stock market or if their debt securities are included into the regulated market. At the same time it should be pointed out that no company in Latvia is prohibited to prepare financial statements in conformity with IAS/IFRS. However, if a company voluntarily chooses to prepare a financial statement in conformity with the requirements of IAS/IFRS, it shall have to prepare a financial statement also in conformity with the laws and regulations of Latvia. This gives more privileges to the holding companies and large State capital companies of Latvia for which the legislation envisages an opportunity to choose: to prepare their consolidated statements either in conformity with the requirements of IAS/IFRS or the requirements of Latvian legislation.

The subject of research was a sample of 26 financial statements of Latvian companies: 15 banks and 11 non-financial companies that prepare their statements in conformity with the requirements of IAS/IFRS. The information about the financial statements of banks has been obtained from their home pages in the internet, but the information about the financial statements of non-financial companies – in the publicly available Nasdaq Baltic stock market from the Baltic regulated market list. According to the author's opinion, in order to get assurance the company's financial statements are prepared in accordance with regulatory framework, it is useful to include into this research the listed companies. The regulations of the NASDAQ OMX Riga stock exchange require that all the listed companies must include into their audited annual reports also their corporate management issues. The stock exchange also encourages the development of corporate social responsibilities (CSR) principles by presenting various awards on the level of the Baltic States (Sneidere, Vigante, 2014). In order a company could list its securities at the Baltic stock market, it should be in operation for at least 3 years; it should have at least EUR 4 million market capitalization and at least 25% of shares, or shares worth of EUR 10 million, in public hands (NASDAQBALTIC).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

The author divided the chosen companies into three groups: banks, production and trade companies and service companies. The author examined their CI statement for the year 2017 according to the following indications:
1. The form of the CI statement (one or two statements),
2. Expenses classification method (based on the nature or the function) in the statement of P/L or P/L section,
3. Method for the disclosure of OCI items (after or before tax),
4. The OCI items and their impact on the reported profit or loss of in studied entities,
5. The impact of the methodology of CI statement preparation on the indicators of company's profit, using the ratios of profitability.

Within the framework of research, the author chose two basic indicators of profitability - Return on Equity (ROE) and Return on Assets (ROA). Where a business has a policy of regular revaluation of assets, the ROA is likely to provide a better measure of economic performance (O`Regan, 2007). Such ratio measures the profit that an enterprise is generating relative to the assets employed and shows productivity of capital (Fridson, Alvarez, 2011). In its turn, ROE is a comprehensive indicator of a firm`s performance because it provides an indication of how well managers are employing the funds invested by the shareholders to generate returns (Palepu, Healy, Bernard, 2004). For the practical calculations of profitability indicators, the author used the formulas, where Net Income is an equal item to Profit or Loss for the period:

$$\text{ROE, \%} = (\text{NET INCOME/EQUITY}) \times 100 \quad \text{[Fridson, Alvarez, 2011]} \qquad (1)$$

$$\text{ROA, \%} = (\text{NET INCOME/ASSETS}) \times 100 \quad \text{[Palepu, Healy, Bernard, 2004]} \qquad (2)$$

In order to evaluate the impact of CI statement methodology on the company`s profitability, the author modified these formulas ($ROE_{RC;}$ ROA_{RC}) by reclassified items of OCI:

$$ROE_{RC}, \% = (\text{NET INCOME+ RECLASSIFIED OCI})/\text{EQUITY} \times 100 \qquad (3)$$

$$ROA_{RC}, \% = (\text{NET INCOME+ RECLASSIFIED OCI})/\text{ASSETS} \times 100 \qquad (4)$$

3.2. Results

The results of the analysis on the CI statement methodology and OCI impact on profit or loss are summarized in Table 2.

Table 2. Statement of Comprehensive Income Preparation Methodology and OCI Impact on Profit or Loss (number of companies)

Company	Number of companies	Type of CI statement		Method of P/L statement		Reported profit or loss		Items of OCI			OCI items impact on reported P or L		
		1 stat.	2 stat.	nature	function	profit	loss	no item	after tax	before tax	incr.	decr.	no impact
Banks	15	10	5	6	9	12	3	1	12	2	11	3	1
Production and trade companies	7	7	0	1	6	5	2	1	3	3	4	1	2
Service companies	4	2	2	1	3	1	3	2	1	1	0	1	3
Total	26	19	7	8	18	18	8	4	16	6	15	5	6

Source: compiled by the author

As we can see in Table 2, most of the companies (73%) have prepared CI statement as one statement consisting of two sections – a P/L section and an OCI section. Most of the companies (69%) have prepared their statements of P/L on the basis of the function of expenses. Most of the companies (85%) recognize in their CI statement the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

items of other comprehensive income, and most of them (72%) recognize these items after tax. Having analyzed those companies in details, which recognize the items of OCI, the author found that most of them (77% or 17 companies) in this part disclose only such gains and losses, which will be reclassified subsequently to profit or loss, but 14% or 3 companies disclose the items, which will be both reclassified and not reclassified, the other 2 companies disclose only those items, which will not be reclassified. All banks and one production and trade company in the reclassified items of OCI disclose the gains and losses due to the fluctuations of the fair value of financial assets available for sale, which most often (58%) is the item included into this section. The second most often reclassified OCI item (38%) is gains and losses arising from translating the financial statements of a foreign operation; this can be observed in the statements of five banks, four production and trade companies and one service company. Such not reclassified OCI item as changes in the intangible assets and fixed assets revaluation surplus has been identified in the statements of 4 companies (two banks, one production and trade company and one service company). Only in 2 statements there has been included the non-reclassified item – remeasurements of defined benefit plans (in the statements of one production and trade company and one service company), but the reclassified item - the effective portion of gains and losses on hedging instruments in a cash flow hedge – has been disclosed in the statement of one service company.

At the next stage of research the author evaluated how OCI items that will be reclassified in the statement of P/L in the next reporting period have impact on the reported profit or loss. In Table 2 it is indicated that most of the companies studied (69%) reported profit in the year 2017 and most of these companies (89%) recognized some OCI items. Insignificant part of companies (31%) reported loss, and most of them (75%) recognized OCI items. Besides, it should be pointed out that most of the companies' (77%) OCI items have impact on the reported profit or loss.

As we can see in Table 2, out of all 26 companies under research, in case of 77% or 20 companies it is possible to observe the impact of OCI items on the reported profit or loss, including 14 banks, 5 production and trade companies and 1 service company. Therefore the author will perform the calculations of profitability only for these companies. The analysis of the impact of reclassified OCI items on the banks and production and trade companies' ROE and ROA has been shown in Tables 3 and 4.

Table 3. OCI Impact on Banks' ROE and ROA

Ratios	Number of banks													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ROE,%	5.3	-4.5	-1.4	15.3	-15.6	20.3	20.7	0.6	11.9	14.6	14.1	10.3	7.6	2.0
ROE_{RC},%	9.0	-1.9	-3.0	21.8	-7.2	28.0	44.0	10.0	15.0	14.4	15.1	17.0	9.4	1.4
ROA, %	0.6	-0.3	-0.1	1.9	-1.1	2.8	2.0	0.1	0.9	1.2	0.9	1.6	1.0	0.2
ROA_{RC},%	1.1	-0.1	-0.2	2.6	-0.5	3.8	4.3	0.9	1.1	1.1	1.0	2.6	1.2	0.1

Source: compiled by the author

Table 4. OCI Impact on Production and Trade Companies' ROE and ROA

Ratios	Number of production and trade company				
	1	2	3	4	5
ROE,%	11.2	1.0	9.9	-32.5	8.4
ROE_{RC},%	11.3	0.9	12.2	-30.7	8.5
ROA, %	9.4	0.7	4.1	-5.7	5.9
ROA_{RC},%	9.5	0.6	5.1	-5.4	6.0

Source: compiled by the author

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(6)

The research shows (Tables 3 and 4) that reclassified OCI items influence the level of profitability indicators. Most of the companies studied (banks -79%, production and trade companies -80%) present positive impact on the assets and equity profitability, because the profitability level is higher. Out of four service companies under research, the OCI items of one company have negative impact on ROE and ROA, namely, the profitability indicators diminish. The calculations performed by author enable to draw a conclusion that by using formula modifications ROE_{RC} and ROA_{RC} and by including the reclassified items into the calculation, the creditors and investors obtain more complete idea of the profit development process at the companies.

Conclusions

Measures of profitability will be important for different users of financial statements. The main financial statement, which shows company`s income, expenses and final financial result - profit or loss - is the Profit or Loss Statement. Since 2009 there have been changed the requirements regarding the preparation of Profit or Loss Statement, and IAS/IFRS provides for a new type - the comprehensive income statement. For those entities in Latvia that shall prepare annual financial statements in conformity with the requirements of IAS/IFRS it is a relatively new financial statement and it should be prepared for annual periods beginning on or after 1 January 2009.

The research showed that Latvian companies prepare comprehensive income statement according to different types; most of them prepare this statement as one statement consisting of two sections: a profit or loss section and other comprehensive income section. Most of the investigated entities recognize in their comprehensive income statement the items of other comprehensive income, besides, it is established that most of them in this section disclose only such gains and losses, which will be reclassified subsequently to profit or loss. Most often the reclassified item used is gains and losses due to the fluctuations of the fair value of financial assets available for sale; it is included into the statements of all banks and in the statements of one production and trade company. The second most often reclassified item of OCI is gains and losses arising from translating the financial statements of a foreign operation; this can be observed in the statements of five banks, four production and trade companies and one service company. Out of the not reclassified OCI items the most often is mentioned gains and losses arising from changes in intangible assets and fixed assets revaluation surplus, which is included into the statements of two banks, one production and trade company and one service company.

The core of items of other comprehensive income (gains or loss) and the division into the reclassified and not reclassified items are important for the company's financial result – evaluation of profit. The research showed that most of Latvian companies under research were influenced by reclassified items, besides, positively - profitability ratios of ROE and ROA. Of course, the impact of reclassified items on profit depends on the core of these items, i.e., whether they increase or decrease the company's profit or loss for the period. The author's point of view is that the requirement to prepare the statement of comprehensive income will enable the external users of financial statements to obtain more complete information on the process of the development of companies' profit, as well as to evaluate more precisely the profitability. The author believes that, when evaluating the profitability of assets and the equity of the company, the financial analysts shall take into account the reclassified items of other comprehensive income, and the calculations shall be performed using the modifications of ROE_{RC} and ROA_{RC} formulas. The substantiation is that these gains and losses arise from the transactions, events and conditions of the reported period, although they will be related to profit or loss in the subsequent periods when specific conditions are met.

References

Bumane, I. Kasale, M. 2012. Accounting Policy of Investment Property - the Case of Latvia, *Journal Economic Research, special issue for the 5th International Scientific Conference "Entrepreneurship and Macroeconomic Management: Reflections on the World in Turmoil"*, Vol. 25: 27-46.

Chambers, D., *et. al.* 2007. An Evaluation of SFAS No.130 Comprehensive Income Disclosures. *Review of Accounting Studies*, Vol. 12: 557–593.

Cristofaro, T. Falzango B. 2014. What Trend for Comprehensive Income Presentation? Evidence from Italy, *International Journal of Accounting and Taxation*, Vol. 2, No.3:17-40.

Detzen, D. 2016. From Compromise to Concept? – a Review of 'Other Comprehensive Income', *Journal Accounting and Business Research*, Vol. 46, No.7: 760-783.

Dyczkowska, J. 2009. Sprawozdawczość finansowa jako źródło informacji wspomagającej wykrywanie kryzysu w przedsiębiorstwie [Financial accountability as a source of information facilitating exposure of a company crisis]. *Zeszyty Teoretyczne Rachunkowości [Theoretical Journal of Accounting]*, 51 (107): 5–14.

European Parliament and of the Council. 2008. *Adopting certain international accounting standards in accordance with Regulation (EC) No 1606/2002*, Regulation (EC) No.1126/2008 of 3 November 2008. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R1126-20140617&from=LV

European Parliament and of the Council. 2013. *On the Annual Financial Statements, Consolidated Financial Statements and Related Reports of Certain Types of Undertakings*, Directive No.2013/34/EU of 26 June 2013. Retrieved from http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:182:0019:0076:EN:PDF

European Parliament and of the Council. 2002. *On the application of international accounting standards*, Regulation (EC) No.1606/2002 of 19 July 2002. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002R1606&from=LV

FASB. 1997. Reporting Comprehensive Income, SFAS No.130. Retrieved from http://www.fasb.org/jsp/FASB/Document_C/DocumentPage?cid=1218220124511&acceptedDisclaimer=true

Fridson, M. Alvarez, F. 2011. *Financial Statement Analysis: A Practitioner's Guide. Fourth Edition*. Hoboken, New Jersey: Published by John Wiley & Sons, Inc.

Gad, J. 2015. Components of Comprehensive Income and Statement of Changes in Equity: An Analysis of Public Companies' Reporting Practices in Poland and Germany. *Management and Business Administration. Central Europe*, Vol. 23, No., 71-88.

Gazzola, P.; Amelio, S. 2014.The Impact of Comprehensive Income on the Financial Ratios in a Period of Crises. *Enterprise and the Competitive Environment 2014 conference*: Procedia Economics and Finance Vol. 12, March 6-7, Brno, Czech Republic, 174-183.

IASB. 2016. Presentation of Financial Statements, IAS 1. Retrieved from http://eifrs.ifrs.org/eifrs/bnstandards/en/2016/ias01.pdf

Lapkova, M.; Stašova, J. 2014. Recognition of Comprehensive Income in Slovak companies. *Accounting Theory and Practice*: Research papers, Vol. 15. Ed. By Rudžioniene, K.; Mackevičius, J. Vilnius, Lithuania. Vilnius: Association of Lithuanian Accounting Educators and Researchers, 8-14.

Mackenzie, B., Coetsee D., *et al.* 2014. Interpretation and Application of International Financial Reporting Standards. Hoboken, New Jersey: Published by John Wiley & Sons, Ltd.

Mackevičius, J. 2007. *Įmonių veiklos analizė: informacijos rinkimas, sisteminimas ir vertinimas. [Analysis of enterprises activity: accumulation, systematization and evaluation of information]*. Vilnius: TEV.

Mackevičius, J.; Giriūnas, L.; Valkauskas, R. 2014. *Finansinė analizė [Financial analysis]*. Vilnius: Vilniaus universiteto leidykla.

Mahn-Bena, A. 2010. Is Comprehensive Income Required by IAS 1 Relevant for Users? A Review of the Literature. *ESCP Europe Working Paper*. Retrieved from: https://halshs.archives-ouvertes.fr/halshs-00494511

Maines, L. A., *et. al.* 2000. Effects of Comprehensive Income Characteristics on Nonprofessional Investors` Judgments: The Role of Financial Statement Presentation Format. *Accounting Review*, Vol. 75: 179-207.

O`Regan, P. 2007. *Financial Information Analysis*. *Second Edition.* Chichester, West Sussex: Published by John Wiley & Sons, Ltd.

Palepu, K. Healy, P. Bernard, V. 2004. *Business Analysis and Valuation: Using financial statements*. *Third Edition.* Mason, Ohio: Published by Thomson and South-Western.

Picker, R., Stanton P., *et al.* 2016. *Applying IFRS Standards, 4th ed.* Published by John Wiley & Sons, Ltd.

Prauliņš, A, Bratka, V. 2012. An Analysis of Comprehensive Income as a Measure of Company's Financial Performance. *Scientific Journal Science and Studies of Accounting and Finance: Problems and Perspectives*, Vol. 8, No.1: 186-189.

Rankin, S., Stantin P., *et al.* 2012. *Contemporary Issues in Accounting*. Milton: Published by John Wiley & Sons, Ltd.

Regulated Market: *Baltic Main List, Entry Preparation and Requirements.* Retrieved from: http://www.nasdaqbaltic.com/en/products-services/listing-2/regulated-market-or-first-north/

Republic of Latvia. 2016. *Law On the Annual Financial Statements and Consolidated Financial Statements.* Retrieved from https://likumi.lv/ta/id/277779-gada-parskatu-un-konsolideto-gada-parskatu-likums (in Latvian)

Sneidere, R. Vigante I. 2014. Legislative Basis for Corporate Social Responsibility Reporting. *Research Journal Economic Annals – XXI*, Vol. No.3-4(1): 58-62.

Inga BŪMANE, PhD is the Professor in the Department of Finance and Accounting at the University of Latvia. Research interests: accounting policy and methodology, accounting standardization at international level and in Baltic States.
ORCID ID: orcid.org/0000-0002-6537-2521

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher

http://jssidoi.org/esc/home

INTEGRAL ASSESSMENT OF DEVELOPMENTAL STABILITY: CASES OF LITHUANIA AND UKRAINE

Liliya Filipishyna[1], Svetlana Bessonova[2], Gerda Venckeviciute[3]

[1]Department of Economics and production organization of Pervomaisk Branch of the National University of Shipbuilding NUS, Pervomaisk, Ukraine

[2]Academy of Social Management, Priazovsky State Technical University, Mariupol, Ukraine

[3]Accounting and audit department, Faculty of Economics and business administration, Vilnius University, Lithuania

E-mails: [1]ontariofilpi@ukr.net, [3]Gerda.venckeviciute@ef.vu.lt

Received 30 March 2018; accepted 22 May 2018; published 30 September 2018

Abstract. The article highlights three directions of stable development: economic growth, ecological management, social integration which cover all the sectors of development. Main tasks and functions are presented in the context of stable enterprise and society development. They can be carried out with the help of certain indicators and applied in different countries, regions, or industries. Approbation of the proposed mechanism was carried out at Lithuanian waste management sector and Ukrainian metallurgical enterprises. The system of stable development indicators proposed by the authors includes three groups for Lithuanian waste management industry case and five groups of them for Ukraine metallurgical enterprises. The ISI - a stability index which is used for integral assessment of industrial enterprises' developmental stability, and is based on calculating complex indicators of economic, ecological, social, risk and market stability. The mechanism of integrated assessment of enterprise stability has been improved and now allows choosing the optimal continuous monitoring method, giving enterprises an opportunity to work effectively and develop steadily for a long period of time. Developmental stability corresponds to the average level and characterizes the need to develop the dimensions for increasing the level of developmental stability of such enterprises.

Keywords: stable development; integral assessment; indicators of stable development; waste management industry; metallurgical enterprise; mechanism of integral stability assessment

Reference to this paper should be made as follows: Filipishyna, L.; Bessonova, S.; Venckeviciute, G. 2018. Integral assessment of Developmental stability: cases of Lithuania and Ukraine, *Entrepreneurship and Sustainability Issues* 6(1): 87-99. http://doi.org/10.9770/jesi.2018.6.1(7)

JEL Classifications: M40

Additional disciplines: ecology and environment

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

1. Introduction

Problem statement in general terms and its relation to essential scientific and practical objectives. The turbulence of the world economic system, globalization and convergence processes require the national industrial enterprises to find the ways to overcome the crisis and improve competitiveness, new sources of sustainable development and domestic economic growth. Thereby, it's especially important that the dynamic development of enterprises obtain the reporting in the sustainable development field. For sustainable development to be achieved, it is crucial to harmonize three interconnected core elements: economic growth, social inclusion, and environmental protection. Both, Ukrainian and Lithuanian enterprises just start to integrate the principles of sustainable development in their activities. Development of indicators system for sustainable development for many of enterprises is relevant primarily in connection with the deterioration of the environment and reducing the effectiveness of environmental solutions. The using of indicators developed by international organizations requires the large amount of information that is impossible to get in some cases. There's a need for improvement of the evaluation of sustainable development system which would open up the possibility for the business management and society to assess the effectiveness of the chosen strategy in the present context.

Analysis of recent researches and publications which initiated the solution to the problem and on which the author relies. The problems with ensuring economic stability of practical systems, economic development and growth were reflected in the works of foreign and domestic scientists: O. Amoshi (2012), B. Y. Parshin, Zielinski, T., Sagan, I., & Surosz, W. (2017), J. Lonska (2017) etc. Their scientific works examined the issues of system determination of essence of sustainable economic development and formation of strategic decisions. However, questions remain on the aspects of development of the mechanism for integrated assessment of sustainable development.

The purpose of the article is the development of the assessing sustainable development of industrial enterprises based on the use of integrated indicators of sustainability (economic, environmental, market, risk, social) for improvement in effectiveness, increase of the competitiveness level and social responsibility of the enterprise. Selection of the unsolved parts of the main problem, which are dedicated to this article. The study of the problem of development of economic systems is one of the central problems in economics. At the same time, it requires further development of the methodology of evaluation of sustainability of industrial enterprises, which would take into account the impact of their activities on society. Statement of the issue is to improve the integrated assessment for sustainable development of industrial enterprises and propose indicators where the diagnosis of the management strategy of sustainable development of the enterprise can be carried out.

The methodology of the research is based on the combination of the theories of management of economic systems in conditions of globalization, convergence and transnationalization of the market economy. The empirical basis of the research of domestic and foreign scientists on the problems of formation and development of the sustainable economic development of industrial enterprises, the statistical reporting, public reporting of companies in the Internet environment, data of the international media organizations, the legislation of Ukraine and Lithuania on questions of regulation of economic activities of enterprises. During the research the following methods have been used: analysis and synthesis (in the research of the organizational forms and entity management structure sustainable development of industrial enterprises), System generalization (in determining the mechanism of the formation of the corporate social responsibility of the enterprises in conditions of sustainable development), statistical and correlative analysis (when grounding the directions of development for conducting economic analysis of industrial enterprises), the comparative analysis (when covering the features of the feasibility assessment of sustainability and effective activity of industrial enterprises at the stage of building the sustainable business development and society). The presentation of the main research material with full justification of scientific results. Basis of achievement of competitive advantage of the entity, in the conditions of economic instability is the observance of the principles of sustainable development. Tools which can estimate stability of development are the indicators of sustainable development. The authors note that the sustainable development indicators are the indicators that are output from the primary information and allow you to judge

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

the condition and / or changes in the parameters of sustainable development. Also, it considers that indexes of sustainable development are the complex indicators received during aggregation of several indicators with each other or with other data (Filipishyna, 2017).

2. Construction of sustainable development indicators

Openness about the impact of enterprise activity on sustainability, the environment and society is of interest to stakeholders. We consider the observance of the imperative of openness, regarding stability, expedient in applying systematic concepts, unified terms and indicators. Based on these investigations we have identified three areas of sustainable development - economic growth, environmental management, social integration, which include all development sectors (infrastructure, resources, agriculture, etc.). Actualization of the development issue, which roses before countries, regions and corporations, primarily caused by variability of methods of formation and implementation of their strategies. On the basis of the carried-out analysis of the international experience in the field of constructing the system of ecological and economic indicators, we allocated two approaches (Sustainability review, 2015): 1) creation of the integrated, and aggregated indicators, which allow to estimate the level of stability of social and economic development (usually aggregating is performed based on three groups of indicators ecological and economic; ecological and social economic; ecological), 2) creation of system of indicators, each of which reflects separate aspects of sustainable development.

Indicators of sustainable development shall reflect economic, social, and ecological aspects of the requirements satisfaction of modern generation without restriction of needs of future generations, on satisfaction of own requirements. Sustainable development of industrial enterprises should be provided with sustainable economic growth, in conditions of its balance with the needs of society. The analysis of works of the leading scientists in this direction allowed to allocate the tasks which are intended for the solution of questions in the context of sustainable development of the entity and society (Bobylev, 2007; Amosha et al., 2012; Vinogradova, 2015; Parshin, 2016; Tvaronavičienė et al. 2018; Tvaronavičienė 2018; Mishenin et al., 2018).

1) Definition of objectives:
- identification of specific purposes of sustainable development policy in a quantitative form;
- development of strategies for future development;
- forecasting of effect of the planned actions.

2) Control:
- monitoring of goal achievement of sustainable development;
- evaluation of progress;
- evaluation of the effectiveness of the policy that was used previously;
- information for planning and making decision by the management of industrial enterprise and regional authorities;
- improvement of quality of management decisions at regional level taking into account line items and the interests of various national groups.

3) evaluation of the competitive position of the company within the country and in the world:
- interregional comparison, justification of transfers;
- relationship of the enterprise with the regional authorities, with the international community, attracting foreign investments, programs, and grants.

In the context of developing sustainable development policy functions of indicators of stability are as follows:

1. To determine the purposes which follow from the general concept of the strategic development program of the entity and don't conflict the regional strategic programs. In this regard, the indicators should reflect the level of achievement of key objectives and activities identified by the programs of the enterprise development and socio-economic development of the region. This will allow set the number of targets for each indicator.
2. To provide the basis for assessment of implementation process of these strategies for various levels (the technical and managerial purposes). Indicators give the chance to perform measurements, monitoring, assessment and the analysis of dynamics and efficiency of actions of goal achievement of sustainable

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

development. The specified will allow to transfer the responsibility for achievement of certain individual target indicators of various departments (for example, indicators of the state of health or employment of the population) and to perform (partial) efficiency evaluation of activities of certain structure elements of public administration for goal achievement of policy.
3. To provide transparent informing of society on strategy implementation and dynamics of actions for achievement of sustainable development.

The critical analysis of literature references, proved that during the using of foreign experience and techniques of creation of ecologic and economic indicators for the industrial enterprises it's necessary to consider the specifics and economic features of the country. However, the correction of the traditional economic indicators, considering the environmental factors may cause the significant reduction. Results of industrial enterprises activities influence the dynamics of all elements of sustainable development of the country, which actualizes the study of problems in area.

3. Case of selected countries and industries

In this article, the development of integrated assessment of development stability is performed on the case of Lithuanian waste management industry, which includes 100 enterprises, and Ukrainian metallurgical entities, which take 7 huge, large and medium enterprises. These sectors are important integrating factors of the countries' economic growth. The structure of the waste management and metallurgical sectors is the defining in appeal level of new kind of business that will cause the emergence of new workplaces, replenishment of budgets with taxes, improvement the quality of life etc. So, the development of primary link of economy - industrial enterprise is the basis of strategy of sustainable economic development of the state. The interaction of the economic, social, and environmental dimensions and their importance to sustainable development is shown in the Figure 1.

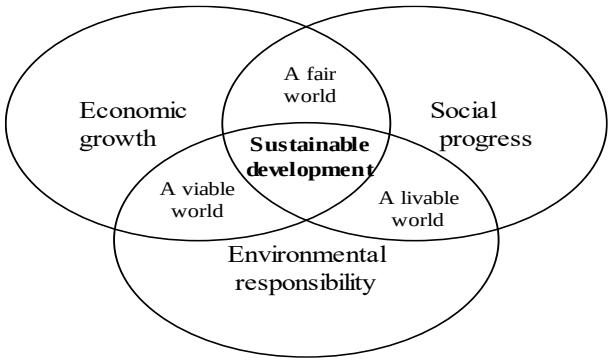


Fig. 1. Sustainable development dimensions

Source: European Commission, 2015

As it is shown in Figure1, it can be made the conclusion that it is crucial to harmonize three core sustainable development's elements: economic growth, social progress, and environmental responsibility to achieve sustainable development. Though practically, availability limits the final choice of indicators (Figge et al., 2006; Manzhynski et al., 2015).

The inter-connection between economic growth and the sustainable development is complex. Economic growth involves the combination of different types of capital to produce goods and services. The maintenance of all types of capital is essential for the sustainability of economic growth. Therefore, the financial analysis of Lithuanian waste management sector was performed to evaluate the tendencies of development of the sector industry (see Table 1).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

Table 1. Lithuanian waste management industry's revenues and net profit variation in 2014-2016 year

	2014	2015	Variation 2014/2015	2016	Variation 2015/2016
Sector revenues, Eur	472 461 218	446 049 645	-5,6%	419 417 095	-6,0%
Median of sector revenues, Eur	2 345 003	2 596 576		2 202 461	
Sector net profit, Eur	10 922 053	5 048 576	-53,8%	15 708 377	211,1%
Median of sector net profit, Eur	30 892	26 889		31 462	

Source: composed by authors based on Lithuanian credit bureau data

As it is shown in the table above, although the revenues of this industry are constantly decreasing in last three years, in recent years the profit has increased significantly. It enables to conclude that enterprises managed to improve the effectiveness of internal processes and so to increase net profit. In order to accomplish multidimensional integral assessment of developmental stability, three sustainable development levels were defined (see Table 2) and used in the assessment of Lithuanian waste management sector process.

Table 2. Sustainable development levels

Dimension	Low importance	Average importance	High importance
	1	2	3
Environmental dimension	Minimum or not at all importance to the environment	Significant importance to the environment	High importance to the environment
Social dimension	Minimum or not at all, insignificant concernment of society or stakeholders	Significant concernment of society or stakeholders	High importance, obvious concernment of society and stakeholders
Economic dimension	Minimum or not at all financial importance	Significant financial importance	High financial importance

Source: composed by authors

After assessment of sustainable development in Lithuanian waste management industry under questionnaire based study, the diagram (see Fig. 2) was composed. As it is shown in the diagram below, the lowest importance in Lithuanian waste management industry still are environmental and social dimensions which indexes are equal to 2,575 and 2,6 – these are evaluated as higher than average, whereas economical dimension index reaches 2,818 and is defined as high importance.

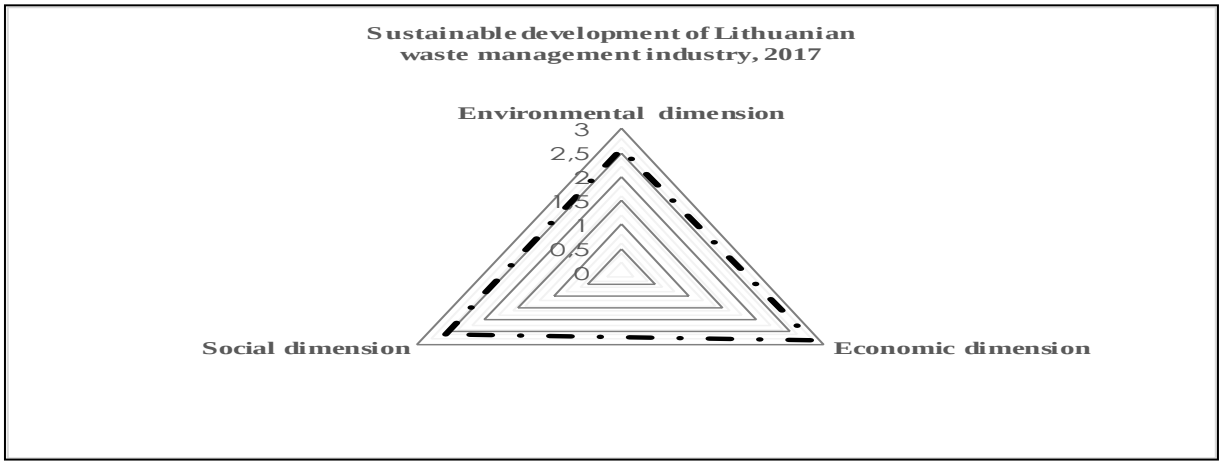


Fig. 2 Sustainable development of Lithuanian waste management industry, 2017

Source: composed by authors

In the second part proposed by the authors system of indicators of sustainable development when adapted to Ukrainian metallurgical entities, includes five groups of indicators:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

- economic which influence tendencies of development of the sector industry;
- social that allow to assess the level of social development and the subordination of goals of economic growth with priorities of the implementation of social development programs;
- environmental parameters that determine the effect on the volume of industrial production on the environment;
- risk - which determine internal property of system, that promotes preserving its integrity as a result of various impacts on external and internal environment;
- market - that interact between the industrial enterprise and society.

The information base of the evaluation of each component is formed by the factors, the quantitative values of which must be set based on the statistical information (see Table 3).

Table 3. Indicators of the statistical information for the integrated assessment of sustainable development of industrial enterprise

Economic indicators	Social indicators	Environmental indicators	Risk indicators	Market indicators
the index of industrial production; volume of capital investments; the amount of state support of investment projects in the industry; the number of innovative enterprises; profitability; presence and level of depreciation of the basic means.	quantity of the created workplaces; size of the average monthly salary of workers in industry; wage arrears; level of work-related injuries; skill level of staff	the volume of toxic waste and emissions into the air; the number of resource-and energy-saving and low-waste technologies; the number of environmental measures	the quality and reliability of the enterprise (organizational structure, material flows, technology, qualified personnel, etc.), the ability to withstand extreme internal and external loads	availability of the bodies exercising sustainable management; availability of the legislative frameworks on sustainable development; cost of maintaining the bodies to administer sustainable development the number of social infrastructure of manufacturing enterprises

Source: composed by authors based on V. Podlisnuk (2005), Y.I. Parshin (2016)

For complex assessment of entity stability, the mechanism which includes the choice of an optimum method of continuous monitoring, that allows industrial enterprises to work effectively and to develop steadily during the long period of time, is used. This process includes collecting data that tracks the dynamic changes of the condition of the company and identify the trends of its development. The mechanism of complex assessment of sustainable development of the enterprise it's recommended to implement in phases as is shown in Figure 3. Each stage consists of several operations, which are interconnected.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

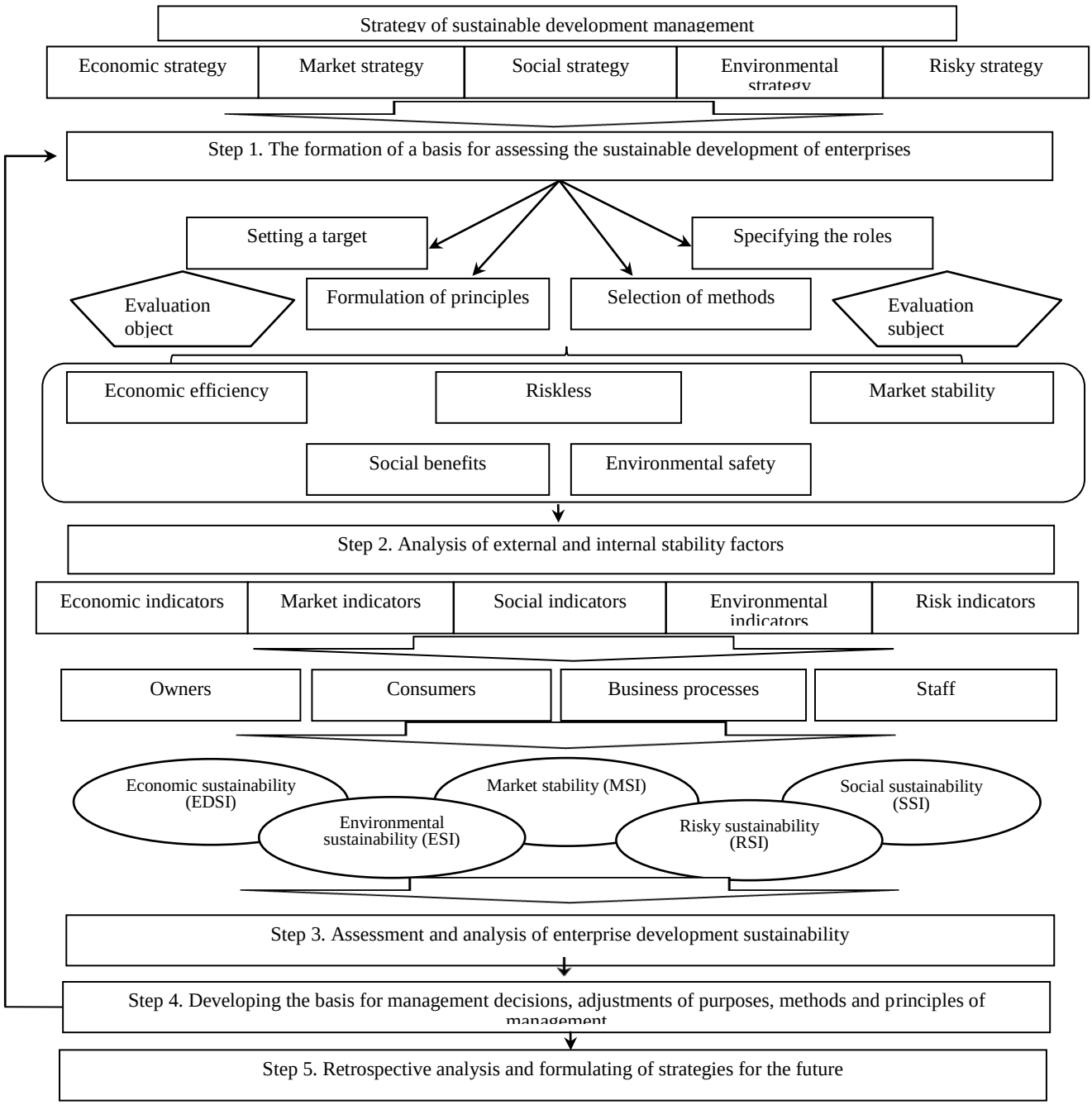


Fig. 3 Mechanism for integrated assessment of sustainable development of enterprises

Source: composed by authors based on N.A. Khomyachenkova (2010), N. V. Shmeleva (2013)

To apply the proposed indicators, we're using the sustainability index of the metallurgical entity development (ISI), which we supplement with a complex indicator of market stability which characterizes preferences of consumers and considers and takes into account the market mechanisms and estimates the level of adoption of development programs of the entity by society. The index of sustainability is based on the geometric average of integrated indicators of economic, environmental, social, risk, and market sustainability.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

$$ISI = \sqrt[5]{EDSI * SSI * ESI * RSI * MSI}$$ (1), where

EDSI - is the economic sustainability
SSI - social sustainability
ESI – ecological sustainability
RSI - risky sustainability
MSI – market sustainability

Interpretation of the index and characteristics of its condition is proposed to conduct with usage of descriptions of the elements of sustainability of the enterprise presented in Table 4 (Filipishyna, 2017).

Table 4. Description of the sustainability of the enterprise

Class resistance	The value of the index	Elements of sustainability	Description
Absolute sustainable development	0,9 < ISI ≤ 1	Economic	Economic situation highly effective
		Market	Balanced trade, price, sales policy
		Social	The personnel is provided with the stable salary, the optimum working conditions and rest are created
		Environmental	All the environmental issues of industrial activity of the enterprise are resolved
		Risky	The meeting its responsibilities by the entity
The average sustainable development	0,6< ISI<0,8	Economic	The economic situation is provided by the stable technical and economic indicators
		Market	Stable promotion of product on the market, consumers are loyal to products of the company
		Social	All the issues on the social protection and security personnel are solved
		Environmental	Is characterized by the amount of payments for environmental pollution within the set limits
		Risky	The company may have some difficulties with compliance with treaty obligations
Unsustainable development	0,3< ISI <0,5	Economic	Values of indicators aren't stable
		Market	The low competitive capacity, market position isn't stable
		Social	Social security of the staff isn't provided
		Environmental	Is weak
		Risky	Enterprise is prone to failure to perform its obligations
Crisis condition	ISI <0,2	Economic	Is characterized by disruptions in production and business activities, output is irregular, the sale of previously produced goods isn't carried out
		Market	The sale of previously produced goods isn't carried out, economic relations aren't reliable
		Social	The significant job losses, high wage arrears
		Environmental	Isn't ensured
		Risky	The company isn't able to fulfill contractual obligations itself

Source: composed by authors based on L.M. Filipishyna, 2017

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

The implementation of groups of enterprises with the subsequent analysis of the obtained results allows reveal regularities, characteristic features of financial and economic state of the enterprises included to the particular group. These findings can be used by management for management decisions, as well as public authorities in the preparation of development programs or the reform of enterprises, the development of effective measures to support enterprises, can also be used in the development of targeted regional programs.

The metallurgical enterprises for the evaluation of the sustainability index were analyzed according to the grouping of the maps for strategic groups' method. Map of strategic groups is a schematic representation on a two-dimensional plane structure of the industry in the context of groups of competing companies, which occupy similar positions in the market and compete on the basis of competitive advantages and the same methods, by implementing similar strategies using analogous resources. Enterprises belonging to the same strategic group can have such signs of kinship: comparable range of products; the same types of distribution channels; similar degree of vertical integration; equivalent service and technical assistance to customers; use of the almost identical qualities and characteristics of the product to related types and needs of buyers; intensive use of advertising in the media; dependence on identical technological approaches; the same prices and quality of products. The closer parameters of the competing companies are, the more carefully you should examine their activities since they are the main competitors within the same strategic group (Kaplan, 2007).

The analysis of strategic groups using the "maps of strategic groups in the industry" is performed in the following sequence:
1. They choose the most essential characteristics of the products or companies in the industry (according to analysis). There are two of them.
2. Make up the matrix card with these two characteristics. It's important that they are not correlated with each other.
3. They count selected features for a product or company, then the product or company are placed on a "map".
4. Objects that were close to each other, are combined in one strategic group.
5. They draw a circle around each strategic group (Kaplan, 2007; Kirich, 2012). It may be useful that total sales of the enterprises of strategic groups in the industry was proportional to the radius of the circle.

To illustrate the maps of strategic groups for the period 2016 is presented in the Figure 4 (Filipishyna et al. 2017; Filipishyna, 2017; Gonchar et al., 2017).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

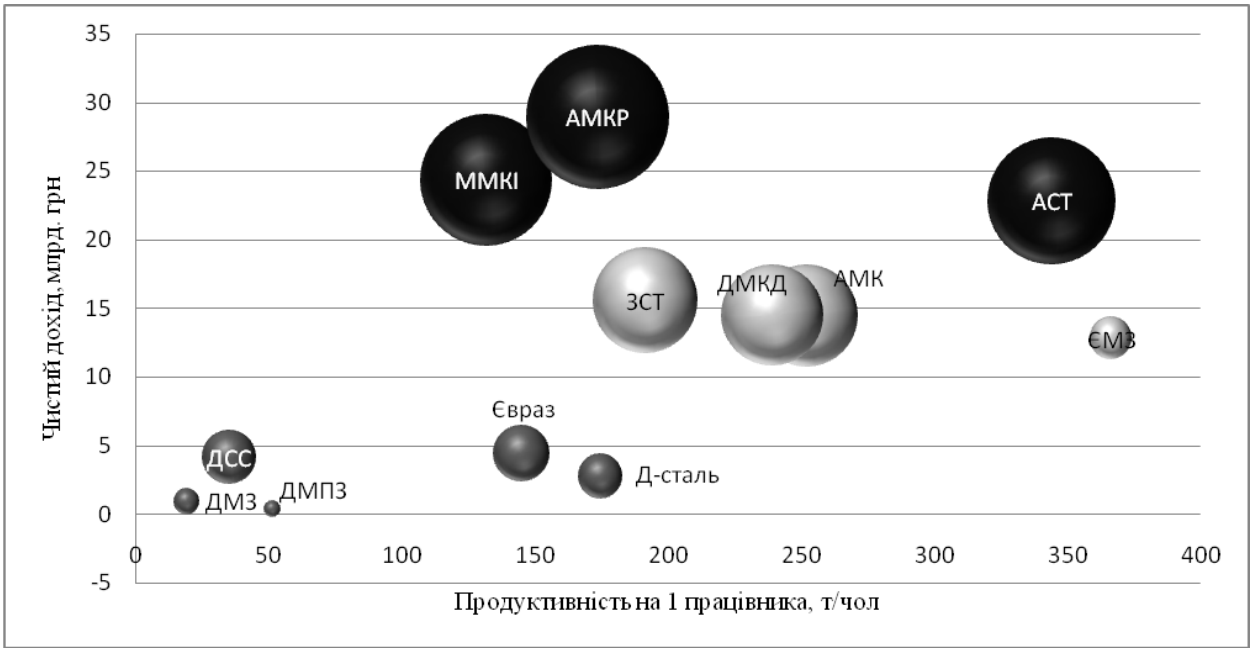


Fig. 4 The map of strategic groups of the enterprises of ferrous metallurgy in terms of productivity per 1 employee in 2016
(Чистий дохід.млрд.грн- Net profit.billion.UAH, Продуктивність на 1 працівника, т/чол- Productivity per 1 employee, t/person, АМКР- AMKR (Arcelor Mittal Kryvyi Rih), ММКІ- ММКІ (ММК named after Ilyich), АСТ- Azovstal, ЗСТ- Zaporizhstal, ДМКД- DMPD (Dnieper Metallurgical Plant named after F. E. Dzerzhinsky), АМК- AMK, ЕМЗ- ESP (Electric Steel Plant), ДСС- DSS, ДМЗ- DMP, ДМПЗ- DMPZ, Евраз- Evraz, Д-сталь- D-stal)
Source: composed by authors based on L. Filipishyna (2017)

The increase or decrease of certain groups and companies within the group is associated with the attainment or loss of competitive advantages. Companies can move to other strategic groups, when changing their parameters. The transition to another group requires a revision of the strategic balance, objectives and strategies of the enterprise. It's necessary to assess properly the place of the enterprise in the strategic group and its competitive environment. The group distribution was based for factors, which are reflected on the "y" axis which was supplied the criteria. It should be noted that this gradation is acceptable as to the position of enterprises on the market in 2016, and in 2001. The study obtained three groups of ferrous metallurgy enterprises (see Table 5).

Table 5. Groups of metallurgical enterprises as of 2016

Name of the strategic group	Enterprise
Huge enterprises (HE)	PJSC "MK "Azovstal"
	PJSC "MMK named after Ilyich"
	JSC "Arcelor Mittal Kryvyi Rih"
Large enterprises (LE)	JSC "Zaporozhya metallurgical plant" Zaporizhstal "
	PJSC "Dnieper metallurgical plant named after F. E. Dzerzhinsky"
Medium-sized enterprises (ME)	PJSC "Electric steel plant "Dniprospetsstal" named after A. M. Kuzmin"
	PJSC "EVRAZ - Dnepropetrovsk metallurgical plant named after Petrovsky"

Source: composed by authors

The authors implemented the proposed mechanism for integrated assessment of sustainable development of industrial enterprises, the case of metallurgical enterprises. To analyze the sustainability there were investigated the indicators of the metallurgical enterprises of Ukraine for 2012-2016 which are divided into groups: huge, large and medium. For calculation of the generalized indicator of stability of development the formula (1) and the system of integral indicators of sustainable development and information of websites of mentioned enterprises are used (see Table 4). The data received in the result of analysis of the development level of the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

entities are interpreted according to the scale of assessments of the generalized indicator of the sustainability of development (see Table 5). The analysis showed the highest resistance in the group of large enterprises (see Fig. 5).

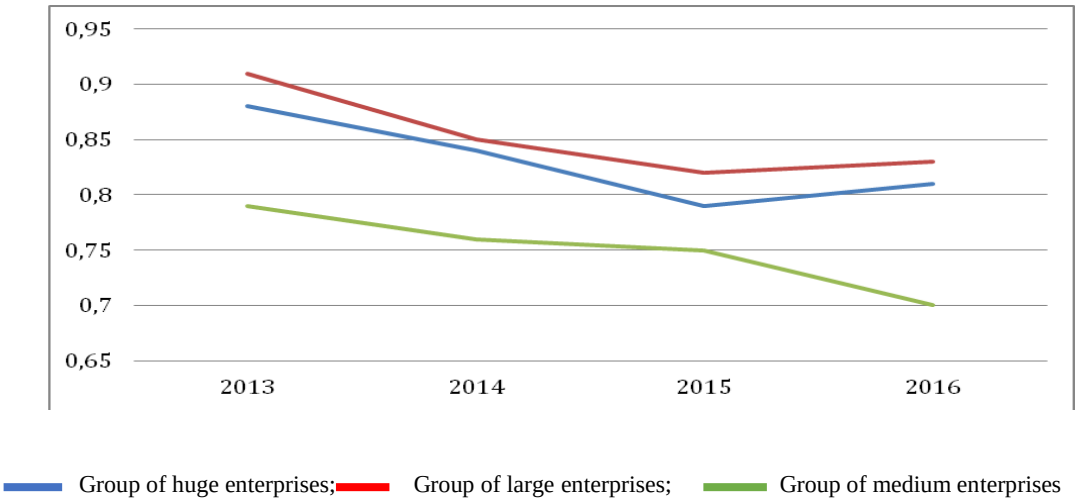


Fig. 5. Dynamics of index of sustainable development on groups of the metallurgical entities (Huge/large/medium enterprises)

Source: composed by the authors based on L.M. Filipishyna et al., 2017

So, PJSC "Zaporizhstal", throughout the analyzed period had the highest value among all groups of the studied companies. The enterprises of the other groups have the following values, then the enterprises from the group "large".

Conclusions

It should be noted that the system of indicators of sustainable development offered by the authors facilitates the strategic dialogue between the entity and society towards sustainable development. The corporate system of indicators uses the integrated structure of results and output which is organized into the five-tire structure and groups the indicators into the chain of results. Consequently, the comprehensive assessment of sustainable development plays an important role in determining the sustainability index and classification of industrial enterprises according to the criterion of sustainability. Among benefits of the methodology it's possible to note that the weight of belonging of the entity to the certain class of decisions can be considered as probability of emergence of stability of the development inherent in this group of companies.

Thus, the proposed system of indicators allows assess the effectiveness of the company's strategies, including its business modernization, in the context of development results. It facilitates the strategic dialogue between the enterprise and society towards the sustainable development.

References

Amosha, O. I. 2012. Sustainable development of industrial region: social aspects: monograph. Academy of Sciences of Ukraine, Institute of economy of industry. *Donetsk, p.534*.

Association "Metallurgprom". [Electronic resource]. Retrieved from: http://www.metallurgprom.dp.ua/

Bobylev, S. N. 2007. Indicators of sustainable development: the regional dimension. Manual for regional environmental policy. *M.: Acropolis, CEPR*, p.*60*.

Figge, F., Hahn, T., Daverio, C., Persson, M., Brunczel, B., Wilhelm, A., & Mauritz, C. 2006. Sustainable value of European industry: a value-based analysis of the environmental performance of European manufacturing companies. *Institute for Strategic Research, scores und Sustainable Investment Research International.*

Filipishyna L, Grishyna L, Zhuvagina I. 2017. Providing strategic stability of business structures in the conditions of the innovative development of the southern region of Ukraine. *International Scientific and Practical Conference World Science.* No 2, Vol. 3, p. 20-27.

Filipishyna, L. M. 2017. Management of the system of sustainable economic development of the entities: theory, methodology and practice: monograph. Mariupol: SHEI "PSTU" p. 290.

Gonchar V.V., Khadzhynova O., Kalinin O. K 2017. Research on investment appeal and competitive capacity of industrial enterprises of Ukraine. Baltic Journal of Economic Studies, Volume 3 Number 5. Riga: Publishing House "Baltija Publishing". – p. 421-431

Kaplan R. 2007. Strategic maps. Transformation of intangible assets in material results / Robert Kaplan, Norton Dayvid. – M.: Publishing house the Olympus - Business, – 520 p.

Khomyachenkova, N.A. 2010. Modern monitoring aspects of sustainable development of industrial enterprises: methodology and practice. Economic studies. Vol. 2. Retrieved from http://erce.ru

Kirich N. B. 2012. Improvement of the methodology of assessment of strategic capacity of the enterprise. Scientific bulletin of the Volynsk national university named after Lesya Ukrainka. No. 4 (229). – P. 67-71

Lonska, J. 2017. Sustainable Value Creation in Latvia, Lithuania and Estonia: Comparative Analysis of Economic Return from the Use of Economic, Social and Environmental Resources. *In Proceedings of the 11th International Scientific and Practical Conference*. No. 1, Vol.184, p. 191.

Manzhynski, S., Figge, F., & Hassel, L. 2015. Sustainable Value creation of nine countries of the Baltic region. Value, changes and drivers. *Journal of cleaner production*, Vol. 108, p. 637-646.

Mishenin, Y.; Koblianska, I.; Medvid, V.; Maistrenko, Y. 2018. Sustainable regional development policy formation: role of industrial ecology and logistics, *Enterpreneurship and Sustainability Issues* 6(1): 329-341. http://doi.org/10.9770/jesi.2018.6.1(20)

Parshin Y. I. 2016. The strategy for the sustainable economic development of the national economy: theory, methodology and practice: monograph. Dnepropetrovsk: University named after Alfred Nobel. p.408.

Podlisnuk, V. 2005 The sustainable development of society: the role of education. Guidebook. K.: publishing house of the LDS "Kovalchuk", p. 88.

Science for Environment Policy, Indicators for Sustainable Cities, in-depth Report Produced for the European Commission. 2015 Environment by the Science Communication Unit, UWE, Bristol. Retrieved:
http://ec.europa.eu/environment/integration/research/newsalert/pdf/indicators_for_sustainable_cities_IR12_en.pdf

Shmeleva, N. V. 2013. Analysis of experience of building sustainable development indicators for industrial enterprises. Collection of works of International Scientific and Economics conference named after academician P. P. Maslova. Berlin: Wissenschaftliche Welte. Vol. 1. p. 227-239.

The world Bank. Electronic resource. – Access:
https://openknowledge.worldbank.org/handle/10986/13192/discover?filtertype=subject&filter_relational_operator=equals&filter=ECONOMIC+GROWTH

Sustainability review, 2015. Retrieved from: https://openknowledge.worldbank.org/handle/10986/22723

The official site of the association "Metallurgprom". [Electronic resource]. - Access: http://www.metallurgprom.dp.ua/

Tvaronavičienė, M. 2018. Towards sustainable and secure development: energy efficiency peculiarities in transport sector, *Journal of Security and Sustainability Issues* 7(4): 719-725. https://doi.org/10.9770/jssi.2018.7.4(9)

Tvaronavičienė, M., Tarkhanova, E., & Durglishvili, N. 2018. Sustainable economic growth and innovative development of educational systems. *Journal of International Studies* 11(1): 236-244. https://doi.org/10.14254/2071-8330.2018/11-1/19

Vinogradova, N. A. 2015. Methods of evaluation of social development. *Contemporary Economic Issues*, https://doi.org/10.24194/11506

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(7)

Zielinski, T., Sagan, I., & Surosz, W. (Eds.). 2017. Interdisciplinary Approaches for Sustainable Development Goals: Economic Growth, Social Inclusion and Environmental Protection. *Springer*.

Lilyia FILIPISHYNA, has PhD in Economics, Associate Professor, Director of Innovation Centre, Associate Professor of the Department of Economics and production organization of Pervomaisk Branch of the National University of Shipbuilding NUS, (Pervomaisk) Ukraine.
ORCID ID: orcid.org/0000-0001-9552-1367

Svetlana BESSONOVA is an associate professor of accounting and audit, Ph.D, corresponding member of the Academy of Economic Sciences, academician of the Academy of Social Management. Priazovsky State Technical University, Ukraine (Mariupol).
ORCID ID: orcid.org/0000-0003-4938-3375

Gerda VENCKEVICIUTE has PhD in Business Management, is the assistant of an associate professor of accounting and auditing, Department of accounting and auditing, Vilnius university, Faculty of Economics and Business Administration, Lithuania (Vilnius).
ORCID ID: orcid.org/0000-0002-7374-8111

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

THE WAVES OF ENTERPRISES BANKRUPTCY AND THE FACTORS THAT DETERMINE THEM: THE CASE OF LATVIA AND LITHUANIA

Jonas Mackevičius [1], Ruta Šneidere [2], Daiva Tamulevičienė[3]

[1,3]Vilnius University, Saulėtekio 9, LT-10222, Lithuania
[2]University of Latvia, Aspazijas blvd. 5 - 431, Riga, LV-1050, Latvia

E-mail:[1] jonas.mackevicius@ef.vu.lt; [2]ruta.sneidere@lu.lv; [3]daiva.tamuleviciene@ef.vu.lt

Received 20 March 2018; accepted 17 May 2018; published 30 September 2018

Abstract. Bankruptcy of enterprises is macroeconomic issue and a phenomenon of a dynamic and competitive market economy. It results in a lot of negative effects not only for the enterprise and its employees but also for other enterprises and institutions, as well as the state and society. The aim of the article is to carry out the analysis of bankruptcy of Latvian and Lithuanian enterprises. No such study has been carried out so far. Article analyses the dynamics of Latvian and Lithuanian enterprise bankruptcy, which manifest themselves in larger waves in certain periods and the factors that influence them. From 1993 – when the bankruptcy of enterprises was started to be officially registered – to 1 January 2017, 21,503 Latvian enterprises and 20,933 Lithuanian enterprises went bankrupt. The largest wave of bankruptcy took place in the period of 2008-2010, when the financial crisis started in both countries. The comparative analysis of Latvian and Lithuanian enterprise bankruptcies was carried out according to the economic activity types and enterprises legal forms. In both countries mostly wholesale and retail trade, repair of motor vehicles and motorcycles enterprises (30% on average) go bankrupt, while construction enterprises (13% on average) are the runners-up. Initiators of enterprise bankruptcy are studied, numbers of Latvian and Lithuanian enterprises that went bankrupt are compared to the overall number of companies in the country. The data of this analysis are valuable when forecasting enterprise bankruptcy and preparing the measures to avoid it. The main research methods: analysis of scientific literature and statistical data, case analysis, methods of collection, grouping, comparison and generalization of information.

Keywords: enterprise bankruptcy, enterprise bankruptcy statistics in Latvia, enterprise bankruptcy statistics in Lithuania, enterprise bankruptcy initiators.

Reference to this paper should be made as follows: Mackevičius, J.; Šneidere, R.; Tamulevičienė, D. 2018. The waves of enterprises bankruptcy and the factors that determine them: the case of Latvia and Lithuania, *Entrepreneurship and Sustainability Issues* 6(1): 100-114. http://doi.org/10.9770/jesi.2018.6.1(8)

JEL Classifications: M490

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

1. Introduction

In dynamic and competitive market conditions, every business faces a higher or lower risk. No enterprise is guaranteed that its activity is going to continue forever, that its services will always be in demand, and that due to fluctuations in demand there will be no need to change volume of activity, dismiss employees, have additional costs, etc. Quite often enterprises' managers – in order to achieve higher profits – undertake riskier activities and those unwilling to risk and having accepted the current situation are usually floundering or are forced to leave the market after they have failed to compete. The most serious outcome of underestimating the risk is the bankruptcy, which results in negative consequences not only for the company but also for its employees, other companies and institutions, state and society.

The bankruptcy of enterprises became one of the mostly studied issues by scientists. Economic, financial and legal questions regarding the bankruptcy have been studied rather thoroughly in the scientific literature. In recent years, more and more attention has been paid to managerial, cultural, ethical, psychological and even philosophical aspects of bankruptcy. Probably the most attention has been paid to the bankruptcy forecasting issue. Some authors prefer to analyse the signs displaying the bankruptcy possibility; some pay their attention to conditions and events increasing the business risk; others maintain that analysis of managers' morale, competence and staff policy should receive the most attention; even others give preference for studying the accounting and internal control system. The number of scientific studies evaluating the efficiency of different authors' bankruptcy forecasting models in certain countries and industries is constantly increasing. New bankruptcy forecasting models are offered. In recent years, many authors have analysed various aspects of enterprise bankruptcy. These are noteworthy: Antonowicz (2014); Aziz and Dar (2006), Bivainis and Garškaitė (2010); Burkšaitienė and Mažintienė (2011); Dyczkowska (2009); Garškienė and Garškaitė (2004); Genriha and Voronova (2010); Genriha, Petere and Voronova (2011); Grigaravičius (2002); Haber (2005); Mackevičius, Giriūnas and Valkauskas (2013, 2014); Prasad and Puri (2005); Purlys (2001); Purvinis, Šukys and Virbickaitė (2005); Šneidere (2005, 2007); Stoškus, Beržinskienė and Virbickaitė (2007); Stundžienė and Boguslauskas (2006); Tvaronavičienė (2001), Kuzmin (2018) and others.

However, their studies have a disadvantage in the sense that they were carried out only in a certain country or a certain industry or even based on example of a group of a few companies with a certain activity. Until now, there have not been many studies of bankruptcies in several countries – especially neighbouring or of similar size; their comparative analysis might reveal a lot of possibilities to decrease the number of enterprises going bankrupt in each country.

The aim of the research: carry out a comparative analysis of Latvian and Lithuanian enterprise bankruptcies.

These goals were set to achieve the aim: 1) analyse the essence of inevitability of enterprise bankruptcy as a phenomenon of competitive market economy; 2) carry out a number analysis of Latvian and Lithuanian enterprises bankruptcies; 3) analyse Latvian and Lithuanian enterprise bankruptcies according to the activity types and legal forms; 4) determine the most important factors influencing enterprise bankruptcy; 5) highlight other important issues of enterprise bankruptcy. *The research object:* Latvian and Lithuanian enterprise bankruptcies.

The research methods: analysis of various authors' scientific literature, analysis of statistical data, case analysis, methods of information comparison, systematization, elaboration and generalization.

2. Enterprise bankruptcy as a phenomenon of competitive market

The term "bankruptcy" (banca rotta in Italian) derives from medieval Italian towns' custom to break the benches of an indebted banker or merchant who had run away (Baird, 1993, p. 4). In modern economical literature,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

bankruptcy is described in many different ways: a bankruptcy is the death of a company, ultimate failure, business of losers, the decline of the employees' expectations, and the end of everything you used to have. Bankruptcy received even more frightening epithets: it is God's scourge for the businessmen sins, it is the cruel twist of faith with no hopes of salvation, etc. So, what is indeed the anatomy and essence of bankruptcy of enterprises?

Bankruptcy is the state of an insolvent enterprise where bankruptcy proceedings have been instituted in court or the creditors are performing extrajudicial bankruptcy procedures in the enterprise. More specifically, bankrupt enterprise means an enterprise declared bankrupt by the court or, in case of extrajudicial bankruptcy proceedings by the resolution of the creditors‘ meeting and put into liquidation due to bankruptcy. Enterprise in bankruptcy means an enterprise against which bankruptcy proceedings have been instituted or in respect of which extrajudicial bankruptcy procedures are applied and enterprise liquidation procedures established by law have not been instituted. Insolvency of an enterprise means the state of an enterprise when it fails to fulfil its obligations (i.e. fails to discharge a debt, to perform prepaid work, etc.) and the overdue obligations (debts, unperformed work, etc.) are in excess of over half of the value of the assets on the enterprise‘s balance (Lietuvos Respublikos įmonių bankroto įstatymas, 2001).

It means that the companies seeking to avoid bankruptcy have to be solvent, i. e. able to settle long-term and short-term liabilities with available payment instruments. The payment instruments are cash and cash equivalents, amounts receivable within one year (trade debtors, amounts owed by entities of the entities group and amounts owed by associates entities, other amounts receivable), raw materials and consumables, work in progress, finished goods, goods for resale, contracts in progress, prepayments for suppliers, other current assets (current investments, time deposits, other assets). These payment instruments could be used to settle short-term (financial debts, debts to suppliers, received prepayments, corporate income tax liabilities, liabilities related to employment relationship, etc.) and long-term (financial debts, debts to suppliers, received prepayments, deferred tax liabilities, etc.) liabilities. However, in reality most of the companies do not have enough payment instruments to settle short-term and long-term liabilities and are forced to go bankrupt.

Speaking of the essence of bankruptcy anatomy, first of all, one has to note that it is not the God's scourge or the cruel twist of faith or something similar, but it rather is a phenomenon of a dynamic and competitive market. It could be added that it is a natural phenomenon, similar to a race from which some athletes are forced to withdraw because they cannot keep up with the leaders' pace. In current global market conditions, this phenomenon becomes more frequent in all countries: companies of different industries (manufacturing, trade, construction, etc.), of different size, and of different legal forms (public companies, private companies, individual enterprises, etc.) go bankrupt.

Many authors (Tvaronavičienė, 2001; Purlys, 2001; Dyczkowska, 2009; Mackevičius, 2007; Šneidere, 2005, and others) consider the bankruptcy of enterprises as inevitable phenomenon of free and competitive market.

Two sides of company bankruptcies – as a phenomenon of competitive market – should be distinguished: 1) negative and 2) positive. The bankruptcies have many negative effects not only on the company itself and its employees but also on other companies and institutions, the state and society. It has been proven that bankruptcies are dangerous for the economy because old and rather large companies with nice traditions and many employees go bankrupt. Often the state has to solve the issues that appear due to company bankruptcies. The worst is that the regular citizens suffer from bankruptcies: they lose their savings and jobs, suffer from mental traumas, etc. The enterprise bankruptcies cause a lot of economic and social problems. Loss of production capacity, weakening of general competitiveness of national economy, unpaid taxes to the state budget, unmet requirements of creditors, etc. can be attributed to economic problems. Increase of the unemployment level, decrease of general national standard of living, citizens' dissatisfaction with weak national economy, uncertainty about the future, etc. can be considered as social problems (Isachsen and Hamilton, 1992; Bivainis and Garškaitė, 2010; Valackienė, 2005).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

On the other hand, bankruptcies should not be viewed as entirely negative phenomenon. New companies using advanced technologies and new forms of organization replace the old ones. The situation when companies go bankrupt but are not replaced by the new ones should be considered as dangerous to national economy. Thus, bankruptcy could be described as a process allowing to increase competitiveness in market, remove unsuccessful businessmen who avoid or are unable to settle with the creditors and replace them with new companies that are able to efficiently develop activity beneficial for the society and discharge their obligations. Yet, the situation is much better when the enterprises survive as long as possible and are beneficial for the state and society.

The managers have to constantly look for ways and means to prevent bankruptcy and ensure successful continuity of activity. One of the most efficient means of bankruptcy diagnostics and prevention is the financial analysis of company's activity. Without the timely and thorough analysis, it is impossible to properly manage the company's resources, determine the right ways to use them, make optimal investment and financial solutions and prepare forecasts of further company development. Only those enterprises, in which financial analysis and activity planning and forecasting were well organized and whose managers try to manage the processes related to business risks efficiently and carefully, can determine the imminent activity crisis earlier, respond to it rapidly and decrease the possibility of bankruptcy.

3. Latvian and Lithuanian enterprise bankruptcies waves

Latvia and Lithuania started to record bankruptcy of enterprises in 1993. In this year 10 cases of bankruptcy have been registered in Latvia and 6 in Lithuania. In 1997 for the first time more than 100 of companies went bankrupt in Lithuania (107 companies in total). The number of bankruptcies per year gradually increased until 2008 and nearly reached 1000. And from 2009 to 2017 approximately 1,770 companies go bankrupt every year. In Latvia already in 1996 more than 200 companies went bankrupt (237 companies in total) and in 1997 the number was 553. In 2002, 1,087 companies went bankrupt in Latvia (and 799 in Lithuania) and in 2010 the number was 2,574 (and 1,673 in Lithuania). However, since 2011 the number of bankruptcies in Latvia – contrary to Lithuania – has been gradually decreasing and now around 845 companies go bankrupt every year. The dynamics of enterprise bankruptcy processes are clearly shown in their changes in every 5 years (see Table 1).

Table 1. Enterprise bankruptcy processes in Lithuania and Latvia per 1993 - 2016 year

Period in years	Latvia		Lithuania	
	Number	Percentage	Number	Percentage
1993-1997	924	4.3	255	1.2
1998-2002	3,983	18.5	2,149	10.2
2003-2007	5,508	25.6	3,468	16.6
2008-2012	7,775	36.2	7,112	34.0
2013-2016	3,313	15.4	7,949	38.0
Total	21,503	100.0	20,933	100.0

Source: compiled by the authors based on Lursoft statistika. Maksātnespējas reģistrs; Įmonių bankrotas. Bankruptcy of Enterprises 2007, 2015; Oficialiosios statistikos portalas

As we can see from the table 1, during the 1993-2016 period, 21,503 companies went bankrupt in Latvia, whereas in Lithuania the number was 20,933. It is a huge loss for these countries' economies and societies. The largest wave of bankruptcies was in 2008-2012, when 7,775 companies went bankrupt in Latvia and 7,112 in Lithuania, which accounted for respectively 36.2% and 34.0% of all the companies that went bankrupt in 1993-2016. The economic crisis, which began in 2008, had the most impact on the bankruptcies wave. The Latvian companies were especially harmed. In 2009, 2,149 companies went bankrupt and in 2010 the number increased to 2,574. Foreign banks that were predominant in Latvia and Lithuania increased the loan portfolio every year: its growth was almost twice as rapid as that of deposit, and as much as 5-6 times more rapid than the actual GDP growth.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

Most of the loans were diverted towards the real estate sector, which influenced creation of real estate bubble. In both republics – due to the economic crisis – unemployment, emigration, inflation, shadow economy increased while level of production volume and consumption shrank. The social tensions and dissatisfaction with governments' policies kept increasing and unfair competition among business participants and partners manifested itself. The increase in the number of bankruptcies showed that both republics' businesses were not ready to survive in extreme conditions, that insolvency of one company negatively influenced other companies, which were unable to recover the debts from the insolvent debtors, and thus were unable to discharge their obligations and went bankrupt themselves (Rugenytė, Menciūnienė and Dagilienė, 2010). This was an example of a so-called Domino effect. Deteriorated economic and political relations with Russia also had a significant impact.

After the economic crisis ended, the number of bankruptcies in Latvia decreased significantly: during the 2013-2016 period, 3,313 companies went bankrupt which accounted for 15.4% of all companies that went bankrupt during the 1993-2016 period, i.e. less than during the period of 1998-2012. One of the reasons is the improvement of the business environment: a) the share of shadow economy from 2013 onwards decreases each year; b) gross domestic product increases year by year since 2013; c) unemployment rate decreases year by year since 2013. Another reason may be due to changes in the conditions for setting up companies. Since July 2010, small capital companies with a capital of 1 euro can be established in Latvia. It can be founded by one or more natural persons (up to 5 people). In addition, a person may be a participant (owner) in only one small capital limited liability company. This means that the person may not owned by two small capital limited liability company (Komerclikums, 2002; point 185[1]). Many companies themselves are liquidated because they must pay an income tax of 50 euros per year if there is no operating income. Statistics on the establishment and liquidation of companies allows one to draw a conclusion, that small capital Ltd don't have enough finance and knowledge to develop company, so they decided to eliminated themselves.

Meanwhile in Lithuania, the number of bankruptcies did not decrease after the end of the crisis and in 2016 it was the highest in history – 2,728 companies went bankrupt. The 09 July 2014 resolution of the Government of the Republic of Lithuania No. 647 "On Confirmation of Rules of Bankruptcy Administrators' Selection", on the basis of which since 01 January 2015 the state institutions (creditors of companies) have had a right to initiate the bankruptcy process by automatically assigning an administrator for companies that have long been inactive, are in debt and have no assets, had a significant impact on the increase in the number of bankruptcy proceedings (Dėl bankroto administratorių…). The State Tax Inspectorate and Social insurance agency became much more active in bankruptcy processes initiation.

Another trend that has been noticed in recent years in Lithuania is the increase in the number of simplified bankruptcy proceedings. From 2003 to 2017, simplified bankruptcy proceedings were initiated for more than 6,000 companies. Simplified bankruptcy proceedings differ from the regular ones because they may not last longer than one year from the day of entry into force of the ruling to apply the simplified bankruptcy proceedings. During simplified bankruptcy proceedings, the creditors' meetings are not convened and the court itself addresses the issues related to the sales of assets of the insolvent company. The share of simplified bankruptcy proceedings out of all the bankruptcy proceedings has been growing and in 2016 accounted for 41.0% of all the bankruptcy proceedings.

The waves of bankruptcies in Latvia and Lithuania affected the companies in most of the industries. It is noteworthy that the spectrum of Latvian and Lithuanian companies' industries is similar. Manufacturing, construction, wholesale and retail trade, transport and storage, agriculture, forestry and fisheries enterprises are the dominating industries. Activities of some companies of certain industries vary a lot. For instance, in the manufacturing field of both Latvia and Lithuania operate manufacture of food products, manufacture of wearing apparel, manufacture of wood and of product of wood, manufacture of furniture, manufacture of chemicals and chemical product, manufacture of fabricated metal product and other manufacturing enterprises, of which some

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

are successful while others go bankrupt because they are unable to compete. The analysis of Latvian and Lithuanian enterprise bankruptcies according to the industry in 2012-2016 showed that in both countries wholesale and retail trade, repair of motor vehicles and motorcycles enterprises go bankrupt the most (see table 2). Those companies accounted for 35.5% of all the companies in 2012 and for 30.8% in 2016, whereas in Lithuania these numbers were respectively 29.5% and 31.4%. Construction is the second most bankrupt-prone industry. In 2012, 129 construction companies went bankrupt in Latvia (14.6%) and in 2016 the number was 93 (12.7%). The situation is similar in Lithuania: 270 construction enterprises went bankrupt in 2012 and 367 in 2016, which accounted for 19.3% and 13.4% respectively.

Table 2. Enterprise bankruptcy processes instituted by economic activity in Latvia and Lithuania 2012 – 2016 year

Economic activity	Latvia				Lithuania			
	Number		Percentage		Number		Percentage	
	2012	2016	2012	2016	2012	2016	2012	2016
1. Agriculture, Forestry and Fisheries	11	22	1.3	3.0	27	48	1.9	1.8
2. Manufacturing	89	82	10.1	11.2	185	252	13.2	9.3
3. Construction	129	93	14.6	12.7	270	367	19.3	13.4
4. Wholesale and retail trade, repair of motor vehicles and motorcycles	313	225	35.5	30.8	413	856	29.5	31.4
5. Transport and storage	63	56	7.2	7.7	117	256	8.4	9.4
6. Accommodation and food service activities	83	91	9.4	12.4	98	198	7.0	7.3
7. Professional, scientific and technical activities	51	45	5.8	6.2	76	159	5.4	5.8
8. Administrative and support service activities	66	48	7.5	6.6	61	255	4.3	9.3
9. Other activities	76	69	8.6	9.4	154	337	11.0	12.3
Total	881	731	100.0	100.0	1,401	2,728	100.0	100.0

Source: compiled by the authors based on Lursoft statistika. Maksātnespējas reģistrs; Oficialiosios statistikos portalas

Therefore, the managers of these industries have to pay a lot of attention to find out the causes of bankruptcy and take specific operational and perspective measures in order to avoid bankruptcy. From other industries, which see a lot of bankruptcies both in Latvia and Lithuania, these are noteworthy: electricity, gas, steam and air conditioning supply; water supply, sewerage, waste management and remediation activities; information and communication; financial and insurance activities; real estate activities; arts, entertainment and recreation and other activities. There are still cases when financial and insurance activities, education and human health and social work activities enterprises go bankrupt; this should not happen and governmental authorities should pay more attention to these companies' activities. When analysing the processes of bankruptcies it is important to analyse the bankruptcies not only according to the industry but also to the legal form (see table 3).

Table 3. Enterprises against which a bankruptcy process has been initiated by legal form in Latvia and Lithuania (1993-2015)

Legal form	Latvia		Lithuania	
	Number	Percentage	Number	Percentage
1. State – owned and municipal enterprises	208	1.0	81	0.5
2. Private companies	17,226	82.9	14,712	80.8
3. Public companies	398	1.9	492	2.7
4. Agricultural companies	409	2.0	224	1.2
5. Individual enterprises	121	0.6	2,220	12.2
6. Others	2,410	11.6	476	2.6
Total	20,772	100.0	18,205	100.0

Source: compiled by the authors based on Centrālās statistikas pārvaldes; Oficialiosios statistikos portalas

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

As we can see from the table 3, the bankruptcy proceedings are usually started for the private companies. In Lithuania, during the 1993-2015 period, 14,712 bankruptcy proceedings were started for private companies, i.e. for 80.8% of all companies. The situation in Latvia is similar, where during that same period 17,226 private companies went bankrupt, i.e. 82.9%. A relatively large number of Lithuanian individual enterprises go bankrupt.
Bankruptcy process means the sum total of judicial or extrajudicial enterprise bankruptcy proceedings. State Social Insurance Fund Board, State Tax Inspectorate, owners, head of the enterprise and others can initiate the bankruptcy process in Lithuania. The data from the table 4 show what the initiators of the enterprise bankruptcy process in Latvia and Lithuania are.

Table 4. Initiators of the enterprise bankruptcy process in Latvia and Lithuania

Initiators of the enterprise bankruptcy process	Latvia		Lithuania (1993 -2016)	
	Number	Percentage	Number	Percentage
1. State Social Insurance Fund	No data		5,642	26.96
2. Head of the enterprise administration			4,044	19.32
3. Owner(s)			1,954	9.34
4. State Tax Inspectorate			1,912	9.14
5. Employees			1,160	5.54
6. Enterprise liquidator			774	3.70
7. Other creditors			5,447	26.00
Total			20,933	100.00

Source: compiled by the authors based on Įmonių bankrotas. Bankruptcy of Enterprises 2015; Oficialiosios statistikos portalas

The table 4 shows that the State Social Insurance Fund Board initiated the most bankruptcies processes during the period of 1993-2016 – 27%. It is worth noting, that in 2015 and in 2016, this board has enormously increased their activities: they instituted almost a half of all the bankruptcy processes (49%). State Tax Inspectorate increased their activities as well: they instituted 507 bankruptcy processes in 2016; i.e. 18.6%; whereas, they had only instituted 9.1% of bankruptcy processes during the period of 1993-2016. The fact that public authorities initiate the bankruptcies after an objective investigation on enterprise activities is thought to be a positive thing because the managers and owners of enterprise administrations often delay the filing of bankruptcy case due to various reasons, even with the knowledge of the difficult financial situation of an enterprise. And the bankruptcy cases that are filed too late determine an even bigger growth of debts: the enterprise remains in debt to the employees still working, the budget, State Social Insurance Fund, the suppliers of goods and services. Inevitably, such process results in transferring a part of expenses of ineffective bankruptcy proceedings to the tax payers. That is why an important part of a state's economic policies is not only a diagnosis of insolvency but a strict regulation of bankruptcy proceedings as well (Tvaronavičienė, 2001, p. 140).

The Authority of Audit, Accounting, Property Valuation and Insolvency Management under the Ministry of Finance and established in January 2016, is doing a significant work in analysing and evaluating bankruptcies in Lithuanian enterprises. One of its aims is to allow the enterprises that face financial difficulties to retain and develop activity, pay off debts and avoid bankruptcy. This authority also tries to ensure the effectiveness of enterprise bankruptcy or structuring proceedings.

4. Factors that determine enterprise bankruptcy

The enterprise bankruptcy is influenced by various factors which are divided into two groups in literature: external and internal. External factors are the factors that do not depend on the managers of enterprises. Internal factors are the ones that depend on the managers of enterprises, their competence, initiatives, managerial skills and ability to make right decisions. Authors from Latvia and Lithuania analysed external and internal factors that influence enterprise bankruptcy and tried to structure them and distinguish the most important ones. Instead of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

analysing the factors, some researchers analyse external and internal causes of bankruptcy. Nearly all the authors agree that business environment has the largest influence of bankruptcy. It is shown by the study carried out by Pricewaterhouse Cooper (see Table 5).

Table 5. Influencing factors on Business environment in Latvia and Lithuania in 2016 (%)

Factors	Latvia	Lithuania
Having a skilled and adaptable workforce	83	81
Bribery and corruption	75	Not asking
New market entrants	44	88
Changes in consumer behaviour	48	67
High unstable energy and raw material prices	50	68
Lack of trust in business	56	47
Supply chain distributions	30	74
Cybersecurity	43	34
Increasing tax burden	85	69
Over-regulation	67	61
Geopolitical uncertainty	78	63
The future of the EU	66	61
The threat of terrorism	33	40

Source: PricewaterhouseCoopers SIA. Baltic CEO Survey, 2016

PwC‘s Baltic CEO Survey involved interviewing 123 respondents from Latvia, and 105 from Lithuania in October and November 2016. The survey covered companies operating in major Latvian and Lithuanian industries: retail and wholesale, banking and finance, construction, processing, IT and telecommunications, health, transport, and other industries. The respondents included CEOs of privately owned and state-owned companies. The survey questions were answered by directors and board members of large and medium companies.

It can be seen from the Table 5 that without most of the factors that were already known and described in economic literature, new factors, whose influence on the enterprise bankruptcies is significant both in Latvia and Lithuania, have appeared: geopolitical uncertainty, the future of the EU, the threat of terrorism. It can be stated that the influence of international external factors has been gradually increasing for most companies' activity, risk and financial results. Latvia and Lithuania became a part of the world’s economy, therefore, changes in Europe’s and world’s economy have a direct effect on certain Latvian and Lithuanian enterprises. Therefore economic globalization, European Union development, and integration of Latvia and Lithuania to the European Union single market with many strong and competitive companies should be attributed to the main external factors.

The study of Latvian enterprise bankruptcies has shown that these factors had the largest influence: requirements of EU directives and regulations; unclear custom proceedings; EU environmental requirement applied to production enterprises; declaration of agricultural product surplus; monopoly strengthening in the market; reduced stock market activity; increased inflation; unstable tax system; reduction of citizen purchasing power; labour force deficit; negative demographic trends; natural disasters (Šneidere, 2007, p. 62).

Based on Lithuanian enterprise bankruptcies practice these most important external factors, influencing the bankruptcy, have been determined: unstable economic and political situation; lower citizens' standard of living; higher labour costs; unfavourable customs policy; increase of the prices of materials; increase in number of new companies in the respective industry; high level of inflation and deflation; unstable legal system; high taxes and their changes; financial and economic crises in other countries; the country's foreign economic relations policy;

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

foreign competitors; changes in the labour market; unemployment level; fluctuations of currency rates, etc. (Mackevičius, 2007; Mackevičius, Giriūnas and Valkauskas, 2013).

Another factor must be named which does not disappear neither in Latvia, nor in Lithuania, and is related to bankruptcies – shadow economy. The study carried by Putninš and Sauka (2017) in Baltic States show that the level of shadow economy in regard to GDP hardly changed (see Table 6).

Table 6. The shadow economy index in Lithuania and Latvia 2009-2016 (% from GDP)

Year	Latvia	Lithuania
2009	36.6	17.7
2010	38.1	18.8
2011	30.2	17.1
2012	21.1	18.2
2013	23.8	15.3
2014	23.5	12.5
2015	21.3	15.0
2016	20.3	16.5

Source: Putninš, Sauka, 2017

The research results show, the main components of the shadow economy are following: non-presentation of income (profit), no employee representation, envelope wages, percentage of income paid to „settle things"/ bribery, percentage of the contact amount that is paid to secure government orders / corruption.

One of factors which give negative influence on companies solvency is late payment (collection period) in commercial transactions. Late payment negatively affects liquidity and complicates the financial management decisions. It also affects their competitiveness and profitability when the creditors need to obtain external financing because of late payment. The risk of such negative effects strongly increases in periods of economic downturn when access to financing is more difficult (Directive 2011/7/EU ...). When looking at the main causes of late payments in Latvia, 75 percent respondents state that they happen due to debtors' financial difficulties. In Lithuania, the aforementioned reason of late payment is stated by 51percent respondents. The second reason for late payments is the disputes regarding goods and services delivered, 66% and 63% in Latvia and Lithuania respectively (European Payment Report, 2017).

The World Bank's "Doing Business" study explains the economic regularities of the insolvency system and outlines the main internationally recognized principles of the insolvency process: a strong insolvency system acts as a filter, which, through redistribution of resources from inefficient companies, ensures successful survival of companies; insolvency proceedings must be carried out quickly and at a low cost, so that companies can quickly restore their daily operations and creditors recover their funds to a maximum; improving insolvency prospects of creditors and debtors, a well-functioning insolvency system can facilitate access to financial resources, save viable companies, thereby overall improving the economy's growth and sustainability (World bank. Doing Business).

The carried out analysis suggests that the number of external factors in today's risky and indeterminate business environment is gradually increasing, thus, being more difficult to avoid them. Even successfully operating enterprises constantly face hard competition, changing technologies and other factors that have a negative impact on their activities. Since different business sectors face different trends and challenges, the manager of every company should be able to identify and name not only external but also internal factors that have a significant impact on operational efficiency and continuity of a certain company.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

In practice a sole factor determining the bankruptcy does not exist; unless it is an exceptional case. It is worth mentioning, that some factors sometimes determine unexpected, sudden bankruptcy of an enterprise while others gradually pile up until they determine a constant decline of an enterprise. It is difficult to say unequivocally which factors – external or internal – have more influence on the bankruptcy. This depends on many circumstances. Although, some studies do reveal that quite a considerable amount of enterprise bankruptcies are the fault of managers and executives: their incompetence, inability to operate in changing conditions of the market, abuse of official position, conservative views, poor decision making etc. (Ковалев, 1994, p.7).

An analysis of Latvian enterprise bankruptcies has shown that negative external factors – when politic and economic conditions are stable – are responsible only for one third of bankruptcies; the other two thirds occur because of internal factors (Šneidere, 2007, p. 62). The most notable internal factors are these: poor state of accounting; poor management of the company; incompetence and irresponsibility of managers; internal conflicts, especially among the managers; ineffective internal control system; lack of working capital and lack of management of cash flow; absence of internal and external audit system; underestimated competitive environment; frauds of employees; poor planning and forecasting of enterprises' activities; lack of enterprise activity analysis and other factors (Mackevičius, Giriūnas and Valkauskas, 2013). It is noteworthy that the external factors influence has synergy effect on the bankruptcy – usually external factors enhance the possibility of internal factors manifestation (Stoškus, Beržinskienė and Virbickaitė, 2007, p. 27). External factors are often the cause for development problems of small and medium businesses (Vijeikis and Baležentis, 2010).

5. Other important enterprise bankruptcy issues

The length of bankruptcy processes is one of the most important issues of Latvian and Lithuanian enterprises. Bankruptcy processes of some enterprises last for quite a long time, it could often be 7-8 years. For example, many of Lithuanian enterprises that were declared bankrupt in 2010 are still dealing with bankruptcy proceedings. 1,552 enterprises were declared bankrupt in 2013, 592 of them are still dealing with bankruptcy proceedings, which accounts for 38.1%. Out of all enterprises that were declared bankrupt in 2014, 969 – or 57.5% – still deal with bankruptcy proceedings (Įmonių bankrotas. Bankruptcy of Enterprises, 2015).

It is noteworthy that bankruptcy processes have tended to last shorter in recent years because enterprise bankruptcy law defined the deadline for bankruptcy proceedings and simplified bankruptcy proceedings have been applied. Among the main reasons why bankruptcy processes last rather long are criminal case initiated for the managers of enterprises or other individuals, low demand for the assets or their absence of enterprises going bankrupt to cover the administrative expenses (Sakalas and Savanevičienė, 2003, p. 134). Due to long-lasting insolvency of enterprises and bankruptcy proceedings debts accumulate and enterprise's assets are wasted, that is why the company – as a business player – becomes unattractive (Purlys, 2001, p. 81).

Another aspect to take into account when analysing bankruptcy issues is the lifespan of enterprises before they go bankrupt. This indicator could be viewed as a positive one because the enterprises' lifespan is getting longer. If, in the first decade of independent Lithuania, enterprises would go bankrupt after only 2-4 years in the market, they now often last around 8 years. For example, the largest proportion of enterprises for which a bankruptcy process was instituted in 2015 was made up of enterprises which from date of their registration to the declaration of bankruptcy existed for 10 and more years (34.4%) and those which existed for 5-10 years (32.1%) and up to 3 years – 15.4% (Įmonių bankrotas. Bankruptcy of Enterprises, 2015).

First years of business are the most difficult. According to global statistics, more than 9 out of 10 companies go bankrupt in the first 10 years, about half of them go bankrupt before they turn 5 years old. It has been proven that the first years of activity is the most difficult stage: the enterprise faces new external environment, aggressiveness of competitors, field of activity untested in practice. Also, the managers and employees lack the necessary

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

information about the market and competition, they often lack the knowledge and skills as well. Some enterprises cannot handle the so called "aggressive growth", i.e. uncalculated and ill-considered expansion. Other managers do not invest into the future, continuity and expansion of their enterprise and have completely unnecessary expenses.

It is necessary to mention these most important reasons that determine the bankruptcy of enterprises in the first three years of their activity: lack of expertise in commercial operations (business was conducted in a way to increase risk); lack of knowledge of business practices (entering into a contract, for example, without being aware of contractual obligations is often serious mistake); inadequate resources to cover the cost of making the business viable (to be viable, some businesses require capital and time many businesses just don't have); excessive expenditure, usually while trying to build business (throwing money at business development can be fatal); failure of clients to pay money owing or to follow through on business projects (business is being dragged down by another failing business); competition (many businesses seriously underrate their competitors); impractical business ventures (high risk ventures generally include costs to business which put the business in debt); financial management (even good businesses can be sabotaged by bad financial management); credit situations (borrowing money on the basis of future revenue) (Sanderson, 2011).

Fraudulent bankruptcy is another major issue that should receive more attention from public authorities and be more of a concern. Those are the cases when the enterprise's, which has just went bankrupt, activities are continued using different enterprise's name. The enterprise that has went bankrupt is deregistered, creditor claims are written off and the manager of the enterprise is put in charge of another enterprise. The Enterprise Bankruptcy Law of the Republic of Lithuania gives the description of fraudulent bankruptcy: "fraudulent bankruptcy is when an enterprise is deliberately led to bankruptcy by poor management (activity or lack of activity) and (or) by arranging deals, when it had been known or should have been known that certain arrangements violate creditors' rights and (or) legitimate interests" (Lietuvos Respublikos įmonių bankroto įstatymas, 2001). So, fraudulent bankruptcies are mostly associated with deliberate actions of enterprise managers who seek to profit in one way or another. It is achieved through different operations and activities e.g., in order not to settle with the creditors, the company sells real estate and shares at a loss, grants loans for the owners in very favourable conditions, even though the enterprise itself is indebted to the bank and so on. Even though, fraudulent bankruptcies are very harmful to the state and society, they are common in many countries and on average account for about 5-6% of enterprises that go bankrupt.

Some experts state that it is possible to profit from the bankruptcy. Allegedly, after a thorough analysis, arrangement and examination, it is possible to avoid debt collection and even profit, e.g., by legalizing money of unclear origin, by submitting various merging and splitting schemes of their enterprises, by changing the names of the enterprises, etc. It can be said that some enterprises declare bankruptcies too late, i.e. when enterprise's assets are minimal. In such case only 10-15% of creditors' claims are satisfied.

One of the most important bankruptcy issues is irresponsibility of managers and accountants. Enterprise managers must try to get as much and as thorough information as possible not only about the current financial state of an enterprise and operational results but to identify the enterprise's potential, weaknesses and advantages in a competitive market as well. However, managers do not always use the information presented by accounting and financial statements of the enterprise, they also do not take into account the influence of external factors which manifest themselves more frequently and intensively in EU today. They should ascertain these things: 1) is there enough information and evidence that financial indicators of the enterprise will keep gradually getting worse in the future; 2) is all the information on the possibility of enterprise's bankruptcy that has been gathered objective, correct and whether it has legal and probative value; 3) is there any data proving that currently positive indicators might change quickly and substantially worsen the state of an enterprise; 4) is there absolutely no possibility to ensure enterprise's continuity, were all the reserves used, was the opinion of the team taken into account; 5) are

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(8)

there any options left to make new decisions. There are risky fields of activity that have to be examined in every enterprise. It is very important to identify the most crucial types of risks that determine the operational results of an enterprise the most. The accountants of enterprises should identify and ascertain: 1) do the managers know which fields of activity are risky; 2) are the managers able to control these types of risks; 3) what is the influence of specific types of risks on most important business processes and the flow of information; 4) what are the possible outcomes of risks, how significant are they to the present and future operations of the enterprise; 5) how likely is it that the operations of an enterprise will go downward, what is the possibility of continuing the business (Mackevičius, Giriūnas and Valkauskas, 2014, p. 391-392).

One has to acknowledge that the enterprise managers' and accountants' irresponsibility, incompetence, indifference, overconfidence and inability to properly evaluate the financial state, level of competition, market changes which result in poor decision making, lead to sudden and unexpected bankruptcies.

Conclusions

Bankruptcy of enterprises is macroeconomic issue and a phenomenon of a dynamic and competitive market economy. It results in a lot of negative effects not only for the enterprise and its employees but also for other enterprises and institutions, as well as the state and society. Loss of production capacity, weakening of general competitiveness of national economy, unpaid taxes to the state budget, increase of the unemployment level, decrease of general national standard of living, uncertainty about the future, etc. can be considered as main economic and social problems.

Latvia and Lithuania started to record bankruptcy of enterprises in 1993. In this year 10 cases of bankruptcy have been registered in Latvia and 6 in Lithuania. In 1997 for the first time more than 100 of companies went bankrupt in Lithuania and Latvia. The number of bankruptcies per year gradually increased until 2008 and nearly reached 1,000. During the 1993-2016 period, 21,503 companies went bankrupt in Latvia, whereas in Lithuania the number was 20,933. It is a huge loss for these countries' economies and societies. The largest wave of bankruptcies was in 2008-2012, when 7,775 companies went bankrupt in Latvia and 7,112 in Lithuania, which accounted for respectively 36% and 34% of all the companies that went bankrupt in 1993-2016. The economic crisis, which began in 2008, had the most impact on the bankruptcies wave.

The waves of bankruptcies in Latvia and Lithuania affected the companies in most of the industries. The spectrum of Latvian and Lithuanian companies' industries is similar. Manufacturing, construction, wholesale and retail trade, transport and storage, agriculture, forestry and fisheries enterprises are the dominating industries. The analysis of Latvian and Lithuanian enterprise bankruptcies according to the industry showed that in both countries wholesale and retail trade, repair of motor vehicles and motorcycles enterprises go bankrupt the most. Those companies accounted for 30-35% of all the companies in Lithuania and Latvia. Construction is the second most bankrupt-prone industry. About 13-14% construction companies went bankrupt in Latvia and 14-16% in Lithuania. The number analysis of enterprises against which a bankruptcy process has been initiated by legal form revealed that the bankruptcy proceedings are usually started for the private companies. They account for about 81 percent of bankrupt Lithuanian and 83 percent of bankrupt Latvian enterprises.

The enterprise bankruptcy is influenced by various factors. Nearly all the authors agree that business environment has the largest influence of bankruptcy. Without most of the factors that were already known and described in economic literature, new factors, whose influence on the enterprise bankruptcies is significant both in Latvia and Lithuania, have appeared: geopolitical uncertainty, the future of the European Union, the threat of terrorism. It can be stated that the influence of international external factors has been gradually increasing for most companies' activity, risk and financial results. Another factor must be named which does not disappear neither in Latvia, nor in Lithuania, and is related to bankruptcies is shadow economy. The main components of the shadow economy

are following: non-presentation of income (profit), no employee representation, envelope wages, percentage of income paid to „settle things"/ bribery, percentage of the contact amount that is paid to secure government orders / corruption.

Other important enterprise bankruptcy issues in Latvia and Lithuania that featured in the research are these: 1) even though bankruptcy processes have gotten shorter because simplified bankruptcy proceeding have been applied they still last too long; 2) even though enterprises' lifespan is getting longer, still, a considerable amount of young enterprises that just started business go bankrupt; 3) assumptions allowing fraudulent bankruptcies still exist, although the number of them in all bankruptcies is relatively low now; 4) the enterprise managers' and accountants' irresponsibility, incompetence, indifference, overconfidence and inability to properly evaluate the financial state, level of competition, market changes which result in poor decision making, lead to sudden and unexpected bankruptcies.

References

Antonowicz, P. 2014. The multi-dimensional structural analysis of bankruptcy of enterprises in Poland in 2013 – results of empirical studies. *Journal of International Studies*, 7(1): 35-45.

Aziz, M.A.; Dar, H.A. 2006. Predicting corporate bankruptcy: where we stand? *Corporate Governance: The international journal of business in society*, 6(1): 18-33. https://doi.org/10.1108/14720700610649436

Baird, D. G. 1993. *The Elements of Bankruptcy*. New York: The Foundation Press.

Bivainis, J.; Garškaitė, K. 2010. Įmonių bankroto grėsmės diagnostikos sistema [The system of diagnostics of bankruptcy threat to the enterprises]. *Verslas: teorija ir praktika [Business: Theory and Practice]*, 11(3): 204-212.

Burkšaitienė, D.; Mažintienė, A. 2011. The role of bankruptcy forecasting in the company management. *Ekonomika ir vadyba [Economics and Management]*, 16: 137-143.

Centrālās statistikas pārvaldes [Central Statistical Bureau]. Retrieved from http://www.csb.gov.lv/par-mums/par-mums-8272.html

Dėl bankroto administratorių atrankos taisyklių patvirtinimo [On Confirmation of Rules of Bankruptcy Administrators' Selection]. Lietuvos Respublikos vyriausybės 2014 m. liepos 9 d. Nr. 647 nutarimas [The 09 July 2014 Resolution of the Government of the Republic of Lithuania No. 647].

Directive 2011/7/EU of the European Parliament and of the Council of 16 February 2011 on combating late payment in commercial transaction. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0007&from=LV

Dyczkowska, J. 2009. Sprawozdawczość finansowa jako źródło informacji wspomagającej wykrywanie kryzysu w przedsiębiorstwie [Financial accountability as a source of information facilitating exposure of a company crisis]. *Zeszyty Teoretyczne Rachunkowości [Theoretical Journal of Accounting]*, 51 (107): 5–14.

European Payment Report 2017. Intrum Justitia. 2017. Retrieved from https://www.intrum.com/globalassets/corporate/publications/epr/epr-2017.pdf

Garškienė, A.; Garškaitė, K. 2004. Enterprise bankruptcy in Lithuania. *Journal of Business Economics and Management*, 5(1): 51-58.

Genriha, I., Petere G., Voronova I. 2011. Entrepreneurship insolvency risk management: a case of Latvia. *International Journal of Banking, Accounting and Finance (IJBAF)*, 3(1): 31-46. https://doi:10.1504/IJBAAF.2011.039370

Genriha, I., Voronova, I. 2010. Maksātnespējas noteikšanas modeļi Latvijas uzņēmumiem [Insolvency Risk Models Validated on Latvian Enterprises]. *Ekonomiskie pētījumi uzņēmējdarbībā [Econimics Research in Business]*, 8: 38-50.

Grigaravičius, S. (2002). Nemokių įmonių pertvarkymas ir alternatyvų parinkimas [Restructuring of insolvent enterprises and alternative choice]. *Organizacijų vadyba: sisteminiai tyrimai [Management of Organizations: Systematic Research]*, 23: 89-95.

Haber, J.R. 2005. Assessing how bankruptcy prediction models are evaluated. *Journal of Business & Economics Research*, 3(1): 87-92.

Įmonių bankrotas. Bankruptcy of Enterprises, 2007 (2008). Vilnius: Lietuvos statistikos departamentas [Statistics Lithuania].

Įmonių bankrotas. Bankruptcy of Enterprises, 2015 (2016). Vilnius: Lietuvos statistikos departamentas [Statistics Lithuania].

Isachsen, A.J.; Hamilton C. 1992. *Ekonomikos pagrindai. Basic Economics*. Vilnius: Alma littera.

Komerclikums. 2002. *[Commercial law]*. Retrieved from https://likumi.lv/ta/en/id/5490-the-commercial-law

Kuzmin, E. A. 2018. Data on empirically estimated corporate survival rate in Russia. *Data in Brief*, 16, 850–864. https://doi.org/10.1016/j.dib.2017.12.01

Lietuvos Respublikos įmonių bankroto įstatymas. 2001. *[The Enterprise Bankruptcy Law of the Republic of Lithuania]*. 2001 m. kovo 20 d. Nr.IX-216. Retrieved from https://www.e-tar.lt/portal/lt/legalAct/TAR.0808D5C392B2

Lursoft statistika. Maksātnespējas reģistrs [Insolvency register]. Retrieved from https://www.lursoft.lv/exec?act=MNR_LSTAT&l=LV

Mackevičius, J. 2007. *Įmonių veiklos analizė: informacijos rinkimas, sisteminimas ir vertinimas. [Analysis of enterprises activity: accumulation, systematization and evaluation of information]*. Vilnius: TEV.

Mackevičius, J.; Giriūnas, L. Valkauskas, R. 2013. Reasons for bankruptcy of enterprises. *Economics*, 92 (3) Supplement B: 7-18.

Mackevičius, J.; Giriūnas, L.; Valkauskas, R. 2014. *Finansinė analizė [Financial analysis]*. Vilnius: Vilniaus universiteto leidykla.

Oficialiosios statistikos portalas [Official Statistics Portal]. Retrieved from https://osp.stat.gov.lt/

Prasad, D.; Puri, Y.R. 2005. Does combining alternate bankruptcy prediction models improve forecasting accuracy. *International Journal of Finance*, 17(3): 3581-3602.

PricewaterhouseCoopers SIA. Baltic CEO Survey 2016. Retrieved from https://www.pwc.com/lv/en/news/pwc-baltic-ceo-survey.html

Purlys, Č. 2001. Įmonių bankroto prevencijos sistemos kūrimas Lietuvoje [Creation of the enterprise bankruptcy prevention system in Lithuania]. *Ekonomika [Economics]*, 53: 75-92.

Purvinis, O.; Šukys, P.; Virbickaitė, R. 2005. Research of the possibility of bankruptcy diagnostics applying neural network. *Engineering Economics*, 1(41): 16-2.

Putniņš, T.; Sauka, A. 2017. *Shadow economy index in Baltic States 2009-2016*. Riga: The Centre for Sustainable Business at SSE Riga.

Rugenytė, D.; Menciūnienė, V.; Dagilienė, L. 2010. Bankroto prognozavimo svarba ir metodai *[The importance of bankruptcy prediction and methods]*. Verslas: teorija ir praktika *[Business: Theory and Practice]*, 11(2): 143-150.

Sakalas, A.; Savanevičienė, A. 2003. *Įmonių krizių vadyba [Management of enterprises crises]*. Kaunas: Technologija.

Sanderson, C. 2011. *The Top 9 Causes of Business Insolvency*. Retrieved from https://www.dissolve.com.au/blog/top-9-business-insolvency/

Šneidere, R. 2005. Causes and factors affecting insolvency. *The International Conference "Accounting and audit system integration into European Union area, new challenges and opportunities".* Selected papers, October 6-7, Vilnius, Lithuania. Vilnius: Lithuanian Chamber of Auditors, 233-243.

Šneidere, R. 2007. *Methods of financial analysis for forecasting enterprise bankruptcy*. Summary of the dissertation. Riga, Latvia University, Economics, theory of accounting and accountancy.

Stoškus, S.; Beržinskienė, D.; Virbickaitė, R. 2007. Theoretical and practical decisions of bankruptcy as one of dynamic alternatives in company's performance. *Engineering Economics*, 52(2): 26-33.

Stundžienė, A.; Boguslauskas, V. 2006. Valuation of bankruptcy risk for Lithuanian companies. *Engineering Economics*, 4(49): 29-36.

Tvaronavičienė, M. 2001. Įmonių bankroto proceso ekonominio efektyvumo didinimo kryptys [Approaches to enhancing of efficiency of enterprises' bankruptcy process]. *Ekonomika [Economics]*, 54: 135-144.

Valackienė, A. 2005. *Krizių valdymas ir sprendimų priėmimas [Management of crises and decision-making]*. Kaunas: Technologija.

Vijeikis, J.; Baležentis, A. 2010. Smulkaus ir vidutinio verslo vystymo problemos bei perspektyvos Lietuvos regionuose [Problems and perspectives of small and medium business development in regions of Lithuania]. *Vadybos mokslai ir studijos kaimo verslų ir jų infrastruktūros plėtrai [Management theory and studies for rural business and infrastructure development]*, 20 (1): 163-173.

World Bank. Doing Business. Retrieved from: http://www.doingbusiness.org/data/explore/economies/~/media/giawb/doing%20business/documents/profiles/country/LVA.pdf?ver=2

Ковалев, А.И. 1994. *Финансовий анализ и диагностика банкротства [Financial analysis and prediction of bankruptcy]*. Москва: Экономическая академия.

Jonas MACKEVIČIUS is the Professor emeritus, habil. Doctor of Accounting and Auditing Department, Faculty of Economics and Business Administration, Vilnius University. Scientific interests: international accounting, auditing, financial analysis, management accounting.
ORCID ID: orcid.org/0000-0002-3350-6214

Ruta ŠNEIDERE is the Assoc.professor, head of the professional study programme "Accounting, Analysis and Audit" at Faculty of Business, Management and Economics of University of Latvia, Head of the Attestation Committee of the Latvian Association of Accountants. Scientific interests: financial analysis, bankruptcy prediction, tax policy, accountants' education and professional development.
ORCID ID: orcid.org/ 0000-0003-0521-7471

Daiva TAMULEVIČIENĖ is the Assistant of Accounting and Auditing Department, Faculty of Economics and Business Administration, Vilnius University. Scientific interests: controlling, management accounting, modern cost accounting systems, financial management, financial analysis.
ORCID ID: orcid.org/0000-0002-0187-037X

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

DIFFERENTIATION OF PERFORMANCE MATERIALITY IN AUDIT BASED ON BUSINESS NEEDS

Audrius Masiulevičius[1], Vaclovas Lakis[2]

[1,2] Vilnius University, Saulėtekio al. 9, Vilnius

E-mails: [1]audrius.masiulevicius@evaf.vu.lt; [2] vaclovas.lakis@evaf.vu.lt

Received 18 March 2018; accepted 3 May 2018; published 30 September 2018.

Abstract. Companies are exposed to various risks. Failure to identify and eliminate them may aggravate the development of companies, some of which may be forced to cease operation. Audit can help in revealing the majority of risks. The auditor has an unlimited access to the information, operational strategy, and in some cases even to commercial secrets, of the auditee. Auditor collects a large amount of different information about the company, but it is used only as much as necessary for formulating a conclusion about financial statements. Upon a closer cooperation of the auditor with the persons in charge of the governance of the audited entity, the client needs can be identified and, once the audit plan is slightly revised, the areas that are within the interest of the client can be analysed in more detail. This article aims to investigate the determination of performance materiality in audit to separate classes of transactions based on the principal areas of importance identified by the business undergoing audit. Based on the data collected during the study, a modified model for determining performance materiality in audit was created which can help to identify better the current and potential risks of the distinguished areas. The application of this model enables carrying out an audit in the areas which are of the highest importance to the users of the audit results more effectively and providing them with more detailed information in the management letter. This would help to identify the substantial risks of the auditee in more detail and on time.

Keywords: materiality, audit, risks, tolerable error, management letter.

Reference to this paper should be made as follows: Masiulevičius, A.; Lakis, V. 2018. Differentiation of performance materiality in audit based on business needs, *Entrepreneurship and Sustainability Issues* 6(1): 115-124. http://doi.org/10.9770/jesi.2018.6.1(9)

JEL Classifications: M 42.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

1. Introduction

Companies, especially the newly established ones, encounter various difficulties which can be hard to overcome at times. Based on the information of the United States Bureau of Labor Statistics, only approximately 50% of the newly established enterprises overcome the period of five years in business (Survival of private..., 2017). There are various reasons for such poor results. According to the study carried out in the United Kingdom in 2015, the main problems are as follows: the access to financing, late payments made by clients, rising wage costs, insurance management problems (Challenges ahead for..., 2016), constantly changing tax laws (Payroll Challenges Are..., 2017), cashflow management, budgeting and other risks. There can be various types of risks, anything varying from easily removed to the most complex situations, the solution of which requires a lot of resources. Not all companies, however, have enough experience to identify all the most important risks. Additional financial resources may also be insufficient for hiring external consultants.

The external audit being carried out may be a suitable tool for revealing the majority of risks and helping to avoid them. The procedures carried out by the auditor and the number of them on the large scale depends on the materiality applied by the auditor. This value is determined based on the professional decision of the auditor. Although the auditor should specifically assess the expectations of users of financial statements in terms of materiality, and to audit mainly those areas which are of the highest importance to the auditee and the persons concerned, a few studies have confirmed that the materialities used by the auditors and the expectations of users of the financial statements differ (Holstrum & Messier, 1982; Jennings et al., 1987; Chewning et al., 1998; Iskandar & Iselin, 1999; Cho et al., 2003; Messier et al., 2005; Rooij, 2009; Aljaaidi, 2009; Kristensen, 2015; Eilifsen & Messier, 2015; Lakis & Masiulevičius, 2017). When the auditor cooperates with the persons responsible for the management of the entity under audit more closely, it is possible to identify the client needs better and to rely on them when determining performance materiality. This would help to further analyse the riskiest areas which are of the highest importance to the company management. Carrying out the determination of performance materiality based on the business needs to every area separately would help to provide more detailed comments and insights about the risks of the areas concerned.

There have been a number of studies carried out on determination of materiality on separate areas: Zuber et al. (1983) proposed an algorithmic model for determining materiality; Dutta & Graham (1988) developed an analytical method for determining materiality for accounts based on expenditure. Emby & Pecchiari (2013) researched the influence of qualitative factors on the materiality to accounts. All of these studies, however, did not analyse the expectations of users of financial statements and its effect on the materiality of various accounts. Thus studies for determining the materiality of financial statements for separate accounts, which would analyse the expectations of users of financial statements, have currently been in a particularly high demand in order to have a different prospective of the audit process and the expectations of the new businesses. 15 experts from different companies were interviewed during the study. Based on the data obtained, a model for determining the performance materiality in audit was suggested which would help to audit the riskiest areas that are within the interest of the management of audited entities in more detail.

2. Expectations of audited business with regards to information about risks in the company

When it comes to the audit of financial statements, in some cases the audited entity believes that a very detailed inspection and analysis of all the areas are being carried out during the audit, and this should help the auditor to detect fraud (Coenen, 2012) or all the risks, but it does not exactly work that way in real life. The auditor seeks to achieve the main objective of audit, i.e. to enhance the degree of confidence of intended users in the financial statements. This is achieved by the expression of an opinion by the auditor on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework. In the case of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

most general purpose frameworks, that opinion is on whether the financial statements are presented fairly, in all material respects, or give a true and fair view in accordance with the framework (ISA 200, 2009). International auditing standards name requirements and tasks which the auditor has to carry out and what evidence they have to collect in order to achieve this objective of the audit of financial statements. Therefore, the aim of the audit is not to identify all the risks which would be of interest of the auditee but to carry out the audit within the framework of the materiality determined.

By expressing opinion, the auditor expresses view on whether financial statements meet the financial position, performance or cash flows of the company, and the audit procedures are being planned based on the materiality established (both based on the planning materiality and on performance materiality). International standards on auditing obliges auditor to properly notify the persons in charge of the government about significant flaws in the internal control determined by the auditor during the audit (260 TAS, 2009; ISA 265, 2009; ISA 315, 2009). Significant flaws in the internal control, however, do not include less material risks, i.e. the aim of the auditor is to determine the critical risks, but the audit procedures are not planned in the way that all the risks would be identified in detail. However, some areas in terms of operation may be important to the company management, but on the financial audit point of view and in the framework of established materiality, they are not important to the auditor; thus the audited entity may not get the test results about these areas in detail. Moreover, further to what has already been mentioned in the beginning of the article, the expectations of entrepreneurs of the value of materiality applied by the auditor often do not correspond with the materiality adapted by the auditor; therefore business may receive insufficient information about the misstatements and risks which the businesses would expect.

Audit resources are focused on searching for misstatements or errors in the financial statements based on the materiality determined. In order to increase the contribution of the audit in identifying the risks of business, especially that of a new business, which could significantly contribute to the consolidation of a new business in the market (by eliminating risks on time), the process of establishing materiality should be improved. Audit materiality is one of the most important criteria used by the auditor that determines the number and type of the procedures carried out; thus a more detailed analysis of applying this materiality can help to find ways how to carry out audit more effectively and contribute better to identifying risks that business is exposed to.

3. Limitations of determining performance materiality in audit

In order to improve the final benefit of audit results to the business, it is important to understand the few types of audit materiality of financial statements. The first one is the *planning materiality*– misstatements, including omissions, are considered to be material if they, individually or in the aggregate, could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements (ISA 320, 2009). A few main models of determining planning materiality (McKee & Eilifsen, 2000)have been named, the*Model of the Unit Rule* is one of them. When applying this model, materiality is estimated by choosing a specific financial indicator based on various qualitative parameters and applying a certain percentage on it. E.g. a 5% from profit before tax, 0.5 % from assets or income etc. The *Model of Size Rule* is a model based on the *Model of the Unit Rule*, but a specific percentage from a chosen financial indicator is not applied in this case. A range of the percentage, that may be used, is determined to every financial indicator, e.g. 5–10 % from the profit before taxes, 0.5–1 % from all the income etc. The *Average Model* is a model which uses four or five financial indicators (based on the unit rule), and the auditor assigns a weighted average to every of these indicators. E.g. a weighted weight of 20% is attributed to the profit before taxes, 40% – tothe comprehensive income, 20% – to the assets, 20% –to the equity. The final materiality is calculated based on the formula of weighted average. *The Formula Model* is a model where a mathematical formula, which would be deducted based on statistical analyses, is used.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

The second concept of materiality is *Performance Materiality* which is the amount or amounts set by the auditor at less than planning materiality to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds planning materiality (ISA 320, 2009). First of all, the planning materiality is determined and based on it, the performance materiality is determined (it is lower than planning materiality) which is used to determine the number and the type of audit procedures. The value of performance materiality is often inversely proportional to the scope of the audit procedures carried out. If the value of performance materiality is too low, it may lead to possibly unnecessary audit procedures being carried out (Barnes, 1973), which costs financial resources (Bagshaw & Selwood, 2014). On the contrary, too high performance materiality means lower numbers of audit procedures. The areas, where a lower value of performance materiality is applied, will be analysed and audited in more detail, and there are likely to be more audit observations. Therefore, the exact and correct calculation of this type of materiality is the principle task which leads to both achieving the principle objective of the audit, and the quality of the audit results provided to the audited business.

Despite the fact that determining performance materiality is one of the most important tasks of the auditor, the practice of detecting this indicator varies and is under discussion. International audit standards do not provide specific instructions how to estimate materiality (Acito et al., 2009), thus when determining both planning materiality and performance materiality, the auditor relies on his/her professional decision (SAS 107, 2006; Joldos et al., 2010; Statement..., 2015; Raziūnienė & Verbickaitė, 2017). Therefore it is impossible to unanonimously define how materiality is determined due to reason that every auditor or audit firm establishes internal procedures and criterias. But having assessed the main models described in the literature and having looked at the models used by a number of large audit firms (from the audit TOP 4),the most frequent principles for determining materiality may be justifiably presumed.

Based on the definition of materiality, the auditor has to assess the expectations of users of financial statements (Application..., 2015), but most frequently the auditor does it only indirectly. It means that auditor can consider the business needs independently and decide what is important to business, but the auditor is not obliged to ask the users specifically or agree with them on the materiality used. It is a big problem because studies have confirmed that the materialities used by the auditors and the expectations of users of financial statements differ. It confirms that upon choosing a materiality, the auditors do not always consider the needs of users properly. Secondly, the majority of scientific or practical work is dedicated to determining planning materiality only, but determining performance materiality to different accounts has not been subject to much research. Some materiality distribution methods described (McKee & Eilifsen, 2000) are as follows: the *Method of Professional Decision*, when the author carries out the distribution only based on their professional experience. The *Indicator Method* when the distribution is carried out based on the risk assigned – from the lowest to the highest. The *Method of Assessing Past Adjustments* when the distribution is carried out based on the mistakes found in the past. The *Formula Method* when the distribution is carried out based on the mathematical formulas. Still, none of the methods assesses business needs directly. In addition, it is not known whether these methods have been widespread and applied in practice. After the renewed standards on auditing entered into force in 2016, *PWC*, a firm that is a part of the Big Four audit firms, started revealing a materiality level used in the audit report. However, only the value of planning materiality is revealed, whereas performance materiality is not indicated. *EY* is yet another firm, that is a part of Big Four audit firms, which is also reluctant to publically reveal the methodology for determining materiality, but as it can be seen from publicly available sources, a tolerable error is determined of approximately 50% from panning materiality (A short overview...). Therefore, performance materiality is not determined for separate accounts differently.

Performance materiality of audit determines the number and depth of audit procedures. This materiality, however, has not been researched sufficiently, and frequently the models used by audit firms are unknown, thus researching

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

this value and improving its estimation to separate classes of transactions may be one of the ways to increase audit effectiveness by determining the risks in more detail that are of the highest interest to business.

4. Determining performance materiality based on the needs of users

When determining materiality, the auditor has the freedom of professional decision to choose the materiality that is satisfactory to them, but as it has been mentioned before, the materiality determined by the auditor often fails to meet the expectations of users of financial statements, thus it may be presumed that at times the auditor fails to assess these expectations in practice. In turn, the final outcomes of audit may provide little added value to audited entity. In addition, the different classes of transactions or balances are of different importance to the company management; therefore determining different performance materiality to different accounts may help to direct audit resources in a more targeted manner. Synchronizing the evaluations of performance materiality of the auditor and that of the audited entity can help to get a positive outcome, i.e. to determine the performance materiality for different accounts seperatly which would allow to audit accounts in more detail that are within the higherst interest for the client; therefore it is suggested to use the model of three stages for determining performance materiality.

In the first stage, it is necessary to collect information about the areas that are within the interest of the company management directly, i.e. of the areas where the company sees problems and which are the most important ones. The survey method during which the management of the audited entity or other business representatives concerned would provide the information indicated in Figure 1:

THE AUDITOR PROVIDES

Account	Materiality (%)	Importance (X)
Intangible assets		
Tangible assets		
Financial assets		
Other fixed assets		
…….	…….	…….

Fig. 1. Survey with regards to materiality and relevance of financial statements

Source: Compiled by the authors

The survey would be provided to the company with different accounts indicated. The managing staff (executives, shareholders and other participants in the business) would in turn provide the information about the sum of mistakes in percentages in a relevant account which they think would be immaterial and would not have an effect on the decisions made (a lower percentage would represent a higher importance and vice versa, a higher percentage would show that the area is of little materiality or completely immaterial). It is important to note that some studies have confirmed that users of financial statements lack knowledge on materiality (Rooij, 2009; Houghton et al., 2011; Considerations..., 2012); thus upon simplifying the method of a survey, it would be requested to indicate the value of planning materiality (which would be likely to be better understood to the business), but the auditor should determine different materiality based on the accounts on the level of performance materiality. This would help to maintain the established common audit practice with regards to determining planning materiality - the materiality level of all financial statements would be maintained, but the audit procedure would be improved by adjusting performance materiality in accordance with separate accounts.The

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

company management should also indicate the areas which they think are the most important and where they wished the auditor would carry out a verification in more detail or provide more observations/suggestions. The first stage would help to ensure the exclusion of the most important areas, i.e. the most important areas where more analysis is needed for the business and a more detailed analysis and determination of various risks would be excluded on the basis of a different level of materiality or on the level of a separate feature that the area is of particular importance. This stage is important because of the aspect of a direct assessment of expectations. Currently the auditor has to assess the needs of users of financial statements but there is no clear system how they should do and document it – this additional formal stage would help to decrease the gap between the expectations of the auditor and that of the audited entity.

In the second stage the auditor should determine performance materiality based on the information received in the first stage. As it has been previously mentioned, materiality is suggested to be determined not directly based on the materiality value provided by business, but to apply principle of intervals based on this value by determining performance materiality (i.e. in accordance with the materiality percentage provided by business, to choose the final level of performance materiality based on the interval determined). Based on the study carried out in 2015, where 8 largest audit firms in the United States of America had been surveyed, the lowest mark of performance materiality used was 50%, whereas the highest mark was 90% (Eilifsen & Messier, 2015). It has been suggested to differentiate performance materiality within the range of 50–90%. During the study carried out by the authors, information from 15 experts, representing different companies, was collected. The materialities indicated by the experts most frequently (when summarizing different accounts) were distributed as indicated in Figure 2.

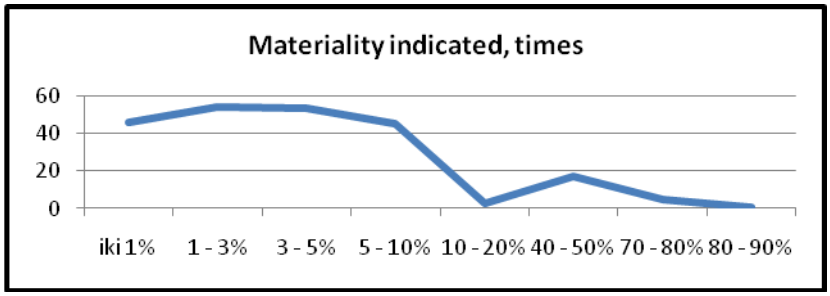


Fig. 2. Materiality percentage indicated by experts for different accounts

Source: Compiled by the authors

The information collected indicates that the distribution of the materiality indicated in the ranges of under1%, 1–3%, 3–5% and 5–10% was similar. A significant drop was determined from the value of 10%. It may be concluded that materiality of over 10% demonstrates that the respective accounts are of very little importance. Therefore, considering the fact that the most frequently applied value of performance materiality is 50–90% and that, in accordance with the information of the study, it has been determined that the materiality identified among the categories of 1%, 1–3%, 3–5% and 5–10% is distributed in a similar manner – it is suggested to distribute performance materiality in equal parts from 50 to 90%. It is suggested to subjectively apply the value of 25% of performance materiality to the areas which are of a high importance to audited business (Figure 3). The number of procedures carried out depends on the value of performance materiality determined (most frequently a higher percentage of performance materiality applied indicates lower numbers of audit procedures); therefore differentiation of performance materiality suggested in Figure 3 to different accounts may better target those areas which are of the highest importance to the audited entity.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(9)

MATERIALITY OF ACCOUNT INDICATED BY COMPANY MANAGEMENT		PERFORMANCE MATERIALITY ATTRIBUTED TO ACCOUNT
UNDER 1% INCLUSIVELY	⇨	90%
1–3%	⇨	80%
3–5%	⇨	70%
5–10%	⇨	60%
10–100%	⇨	50%
MARKED AS IMPORTANT	⇨	25%

Figure 3. Distribution of performance materiality based on survey of audited entities

Source: Compiled by the authors

It is suggested to expand the letter to the management **in the third stage** by describing the determination of performance materiality applied during the audit. In the cases where more detailed procedures were carried out, to describe these areas, their scope and performed procedures. To describe all the additional discovered observations in detail in the areas which are of the highest importance to the audited business, its managers, shareholders, investors and other users of the information of financial statements.

Extended letter to the management team could be used in various ways. Firstly, the audited entity could distribute the resources it possesses more accurately both in solving known risks and in the risks determined additionally. Provided there is an internal audit unit in the audited entity, the work of this unit could be determined or revised based on the new risks determined by external audits. Internal audit unit could predict the actions used for eliminating risks. Failure to identify new risks during audit would give an additional confirmation to the company, i.e. when it is known that more detailed procedures were carried out during the audit and without identifying the risks, the company would be able to give less attention to these areas without concerne. A more detailed analysis of risky areas would help to identify risks on time, and this in turn would help the company to direct resources for eliminating risks on time. Timely elimination of risks could help a company save financial resources and improve enterprise's activities. Differentiation of performance materiality, based on the materialities named by the auditees and the most important areas where business would like to access more detailed information and would like a more detailed inspection, would allow distributing the resources of the audit work more rationally. In turn, the quality of external audit would also improve because the risks important to the users of financial statements would be determined in more detailed; therefore the main goal of audit would be implemented better, and the overall risk of audit would decrease. By determining performance materiality directly based on the client needs, the expectations of the audited entity would be better met and the final audit results,

which would provide a higher added value to the audited business because the audit materiality applied would match the needs of users of financial statements directly, and the final audit results would be expanded.

Conclusions

The value of performance materiality of financial statements has a direct effect on the number and scope of the procedures carried out; thus the correct determination of this materiality is one of the most important tasks of an auditor in order to carry out the audit and increase the added value of the audit results to the business.

Although the materiality value should be applied based on the needs of users of financial statements, the studies carried out in the past confirm that the expectations of the materiality applied by the auditors and that of the business differ; thus in some cases the goal of financial audit statements may not be fully achieved, and the added value created may not be satisfactory to the managers of the auditee or to other persons concerned. Different areas of financial statements are of different importance to business but the research of the materiality applied by audit firms show that audit firms frequently do not reveal how performance materiality is determined precisely, and current practice shows that performance materiality is not determined for different accounts seperatly.

The proposed model would improve audit processes in various aspects and would increase the benefit of final audit results. Firstly, the determined value of performance materiality should reflect the expectations of users of financial statements; thus the opinion of users should be considered directly when calculating materiality. But there are currently no specific practical or methodological guideline show how auditors should carry it out. This suggested model could help the auditors receive written information from the auditee directly about the most important areas thus the risk that materiality fails to meet the expectations of users would decrease significantly. In addition, performance audit materiality would be determined separatly for different account of financial statements based on the needs of a specific business; thus audit resources could be concentrated into the key areas and they could be audited in more detail. A more detailed analysis could also be carried out of the enterprise's activities and potential risks could be identified more specifically. This in turn would lead to an increase in the ultimate reliability of the audit. Additional risks that are within the interest of business, determined along with other observations, would be revealed in the extended letter to the management, which is likely to increase the added value created by financial statements. Also attention would be provided not only to historical data, but also to timely current or potential risks in the company.

References

A short overview. Retrieved from: http://www.unifr.ch/ses/pdf/cours/Audit_methodology_FS_10.pdf

Acito, A. A.' Burks, J. J.; Johnson, W. B. (2009). Materiality decisions and the correction of accounting errors, *Accounting Review*. Vol. 84, Issue 3, p. 659 - 688.

Aljaaidi, K. S. Y. (2009). Reviewing the audit expectation gap Literature from 1974 to 2007 // *IPBJ*. Vol. 1, Issue 1, p. 41 - 75.

Application of Materiality to Financial Statements. IFRS Practice Statement (2015). Retrieved from: http://www.ifrs.org/Current-Projects/IASB-Projects/Disclosure-Initiative/Materiality/Exposure-Draft-October_2015/Documents/ED_IFRSPracticeStatement_OCT2015_WEBSITE.pdf

Ataskaita dėl auditorių ir audito įmonių audito kokybės užtikrinimo 2015 m. [Report on quality assurance audit of auditors and audit firms in 2015]. Retrieved from:
https://www.google.lt/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0ahUKEwi9j4G0kqrUAhXSJSwKHQyZD

v8QFggqMAE&url=http%3A%2F%2Flar.lt%2Fwww%2Fnew%2Frequest.php%3F8925&usg=AFQjCNEFEx3yrnu3UaJALkUCQ79Ux1JrBQ&sig2=kM8yEWnnZBQSIHoJ8R4u7g

Bagshaw, K.; Selwood, J. 2014. *Core Auditing Standards for Practitioners*. Cornwall: John Wiley & Sons, Incorporated.

Barnes, J. (1973). More efficient auditing through an understanding of the materiality concept // *Journal of Accountancy*. Vol. 135, Issue 5, p. 78 - 80.

Challenges ahead for upbeat entrepreneurs. 2016. *Director*. Vol. 69 Issue 8, p. 48-49.

Chewning, E. G.; Eugene, G.; Wheeler, S. W.; Chan, K. C. (1998). Evidence on auditor and investor materiality thresholds resulting from equity-for-debt swaps, *Auditing: A Journal of Practice & Theory*. Vol. 17, No 1, p. 39 - 53.

Cho, S. Y.; Hagerman, R. L.; Nabar, S.; Patterson, E. R. (2003). Measuring Stockholder Materiality, *Accounting Horizons*. Vol. 17, p. 63 - 76.

Coenen, T. (2012). Why didn't the auditors find the fraud? Retrieved from: http://www.sequenceinc.com/fraudfiles/2012/03/why-didnt-the-auditors-find-the-fraud/

Considerations of materiality in financial reporting (2012). Retrieved from: https://www.esma.europa.eu/sites/default/files/library/2015/11/2011_373_.pdf

Dutta, S. K.; Graham, L. E. (1998). Considering Multiple Materialities for Account Combinations in Audit Planning and Evaluation: A Cost Efficient Approach, *Journal of Accounting, Auditing and Finance* Vol. 13, No. 2. 151 - 171

Eilifsen, W. F.; Messier, W. F. Jr. (2015). Materiality Guidance of the Major Public Accounting Firms, *Auditing: A Journal of Practice & Theory*. Vol. 34, No. 2, p. 3 – 26.

Emby, C.; Pecchiari, N. (2013). An Empirical Investigation of the Influence of Qualitative Risk Factors on Canadian Auditors' Determination of Performance Materiality, *Accounting Perspectives*. Vol. 12 Issue 4, p. 281 - 299.

Holstrum, G. L.; Messier, W. F. Jr. (1982). A Review and Integration of Empirical Research on Materiality, *Auditing: A Journal of Practice & Theory*. Vol. 2, No 1, p. 45 - 63.

Houghton, K. A.; Jubb, C.; Kend, M. (2011). Materiality in the context of audit: the real expectation gap, *Managerial Auditing Journal*. Vol. 26 Issue 6, p. 482 - 500.

ISA 200 Overall Objectives of the independent auditor and the conduct of an audit in accordance with international standards on auditing. Retrieved from: http://www.ifac.org/system/files/downloads/a008-2010-iaasb-handbook-isa-200.pdf

ISA 260 Communication with those charged with governance. Retrieved from: http://www.ifac.org/system/files/downloads/a014-2010-iaasb-handbook-isa-260.pdf

ISA 265 Communicating deficiencies in internal control to those charged with governance and management. Retrieved from: http://www.ifac.org/system/files/downloads/a015-2010-iaasb-handbook-isa-265.pdf

ISA 315 (Revised) Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment. Retrieved from: https://www.iaasb.org/system/files/meetings/files/20130415-IAASB-Agenda_Item_5-D_Disclosures%20-%20ISA%20315%20%28Revised%29%20for%20reference%20ONLY.pdf

ISA 320 Materiality in planning and performing audit. Retrieved from: http://www.ifac.org/system/files/downloads/a018-2010-iaasb-handbook-isa-320.pdf

Iskandar, T. M.; Iselin, E. R. (1999). A review of materiality research // *Accounting Forum*. Vol. 23, Issue 3, p. 209 - 239.

Jennings, M.; Kneer, D. C.; Reckers, P. M. J. (1987). A Reexamination of the Concept of Materiality: View of Auditors, Users, and Officers of the Court, *Auditing: A Journal of Practice* & Theory. Vol. 6, No 2, p. 104 - 115.

Joldos, A. M.; Staniciu, I. C.; Grejdan, G. (2010). Pillars of the Audit Activity: Materiality and Audit Risk //*Annals of the University of Petrosani Economics*. Vol. 10 Issue 2, p. 225 - 238.

Kristensen, R. H. (2015). Judgment in an auditor's materiality assessments // *Danish Journal of Management & Business*. Nr. 2, p. 53 - 65.

Lakis, V.; Masiulevičius, A. (2017). Possibilities of harmonizing materiality expectations of the users of financial statements and materiality value applied by the auditor (not published yet), *Vadyba/Journal of Management*. Vol. Nr. 2 (31).

Mckee, T. E.; Eilifsen, A. (2000). Current materiality guidance for auditors, *CPA Journal*. Vol. 70, Issue 7, p. 54 - 58.

Messier, W. F. Jr.; Martinov-Bennie, N.; Eilifsen, A. (2005). A review and integration of empirical research on materiality: two decades later, *Auditing: A Journal of Practice & Theory*. Vol. 24, Issue 2, p. 153 - 187.

Namolo, O. 2017. The top 10 challenges faced by entrepreneurs today: solved. Retrieved from: https://www.deluxe.com/sbrc/financial/top-10-challenges-faced-entrepreneurs-today-solved

Payroll challenges are a fact of small-business life. 2017. Inc. Vol. 39 Issue 9, p. 62-62. Retrieved from: https://www.inc.com/surepayroll/payroll-challenges-are-a-fact-of-small-business-life.html

Raziūnienė, D.; Verbickaitė, G. (2017). Reikšmingumo samprata finansinių ataskaitų audite [Significance concept in audit of financial statements], *Apskaitos ir finansų mokslas ir studijos: problemos ir perspektyvos*. Vol. 11, No 1, p. 41 - 51.

Rooij, D. (2009). Materiality of misstatements from the perspective of the users of the financial statements - Narrowing the expectation gap between users and auditors, *Erasmus University*, p 136-159.

SAS 107 Audit Risk and Materiality in Conducting an Audit. Retrieved from: http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-00312.pdf

Survival of private sector establishments by opening year (2017). Retrieved from: https://www.bls.gov/bdm/us_age_naics_00_table7.txt

Zuber, G. R.; Elliot, R. K.; Kinney, W. R.; Leisenring, J. J. (1983). Using materiality in audit planning, *Journal of Accountancy*. Vol. 155 Issue 3. 42 - 54.

Audrius MASIULEVICIUS is Ph.D student in management at Vilnius University, certified auditor and practitioner of financial statemetn audit. Scientific interests: audit effectiveness of financial statements and development of audit quality.
ORCID ID: orcid.org/0000-0002-2222-0149

Vaclovas LAKIS – Phd, prof. of Audit and Accounting Department, Faculty of Economics, Vilnius University, e-mail: Vaclovas.lakis@evaf.vu.lt. Prof. V. Lakis published more than 270 articles, monographies, textbooks, and the author of several manuals. Scientific interests: audit, fraud investigation in financial statements, management accounting.
ORCID ID orcid.org/0000-0003-0142-9573

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

COMPARATIVE ANALYSIS OF COMPANY PERFORMANCE EVALUATION METHODS

Judita Narkunienė[1], Aurelija Ulbinaitė[2]

[1,2] Vilnius University, Faculty of Economics and Business Administration

E-mails:[1] judita.misiunaite@mif.stud.vu.lt; [2]aurelija.ulbinaite@ef.vu.lt

Received: 19 March 2018; accepted 24 April 2018; published 30 September 2018

Abstract. The evaluation of a company's performance is an integral part of the management of every company, which allows determining the impact of business management decisions on the performance results, as well as the direction of the results and the decisions that need to be made to improve them. Traditionally, a company's performance is evaluated on the basis of an analysis of financial performance indicators, but it is noted that in today's dynamic business environment the timely control of the performance is crucial, thus, there is an increasing attention on non-financial performance indicators. The aim of the article is to investigate and compare the modern methods for company performance evaluation that are based on the analysis of financial and non-financial performance indicators. The research is carried out using systematic analysis of scientific literature, comparison, and aggregation methods. First of all, the article unfolds the essence of the concept of the company performance evaluation and highlights the differences between traditional and modern performance evaluation systems. Moreover, the advantages of non-financial performance indicators are compared with financial indicators. Furthermore, a classification scheme for performance evaluation methods is provided; by identifying their main advantages and disadvantages the most popular and widely used modern performance evaluation methods are overviewed: economic value added method, balanced scorecard, performance prism, performance pyramid, six-sigma model and multi-criteria company performance evaluation method. Finally, according to certain criteria, a comparative analysis of the latter methods is performed. The comparative analysis confirms that non-financial performance indicators complement financial indicators; therefore, in the process of a company's performance evaluation, modern performance evaluation methods, combining financial and non-financial performance indicators and allowing the performance to be evaluated both quantitatively and qualitatively, should be used. However, there is no single method that would be appropriate for all companies, so further work can be targeted at establishing a multi-criteria performance evaluation method that would satisfy the needs of a particular business' activity and targets for evaluation.

Keywords: company performance evaluation, modern performance evaluation methods, financial indicators, non-financial indicators

Reference to this paper should be made as follows: Narkunienė, J.; Ulbinaitė, A. 2018. Comparative analysis of company performance evaluation methods, *Entrepreneurship and Sustainability Issues* 6(1): 125-138. http://doi.org/10.9770/jesi.2018.6.1(10)

JEL Classifications: L25, M21

1. Introduction

Business performance evaluation is an inseparable management part of a company without which it would be difficult to define the impact of business management decisions, the direction of its activity results and the decisions that must be taken to improve the results. Traditionally, business results are evaluated following

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

company's financial data that are given in the financial reports; however, it can be noted that company's financial information is insufficient for more and more companies and, striving to better unfold causal relationships between management decisions and final activity results, a huge attention is drawn on a company's non-financial performance indicators.

The relevance of non-financial information is underlined by European Commission and Board in their published directives regarding disclosure of non-financial information of certain huge companies and groups (2013/34/ES and 2014/95/ES). The directives state that the disclosure of non-financial information is a very significant step in proceeding with the sustainable global economy, where the long-term profitability is under combination with social justice and environmental protection, taking into account that the disclosure of non-financial information helps evaluating, monitoring and managing results of companies' performance results and their impact on society (Europos…, 2014). The directive states that, starting from 1st of January 2017, huge companies of European Union countries members (having more than 500 employees) should involve a non-financial report in their management report, where, as much as it is necessary for understanding company's changes, performance results, status, and the impacts of its activity, the information at least regarding environmental issues, social and staff-related issues, and the aspects regarding respect to human rights, fight against corruption and briberies must be provided. This directive could be an incentive to monitor and fix the non-financial performance indicators not only for huge companies, but also for small and middle-sized ones, since it is stated that this kind of information could increase the trust of investors and consumers.

The significance of non-financial indicators is as well highlighted in the works of researchers of the last decades (Abdel-Maksoud et al., 2005, Lau et al., 2005, Cardinaels et al., 2010, Kotane et al., 2011, Milost, 2013, Kotane, 2015, Ahmad et al., 2016, Modi, 2016), where the modern company performance evaluation systems are presented and discussed. Most of company performance evaluation methods are oriented to business strategies which are not limited to profitability magnification, therefore, the spectrum of performance evaluation is expanded beyond the boundary of financial information by involving the information about both consumer and employee satisfaction, execution of processes, growth possibilities and similar. It is worth to note that the necessity of monitoring and evaluating the non-financial indicators is highlighted in evaluation of performance results of manufacturing companies, since there it is most often one has to manage many processes, which are complicated to be evaluated following barely the financial information. Therefore, striving to evaluate manufacturing company performance results, it is significant to apply the methods that could involve both financial and non-financial information, related to processes, employees and similar.

The goal of this article is to review and compare the modern company performance evaluation methods, justified by financial and non-financial performance indicators analysis. This research is conducted using the methods of scientific research literature analysis, comparison and aggregation of research information.

2. The concept of company's performance evaluation

Performance evaluation is defined ambiguously in the research literature (see Table 1). Some authors (Neely, Gregory, Platts (1995), Marshall, Wray, Epstein, Grifel (1999), Najmi, Kehoe (2001)) perceive performance evaluation as a process, where company's results are evaluated quantitatively by analysing certain indicators. On the other hand, the authors of the latter decade (Moullin (2007), Klovienė (2012), Choong (2013), Peleckis (2013)) note that performance evaluation should not necessary be quantitative. Managing quality evaluation, defining customer value and value created for other interested parties, disclosure of common business situation, and raising further goals for improvement are significant. Out of a list of definitions in research literature, the most resumptive and exact perception of performance evaluation is provided by Klovienė (2012): it is a broad and multifunctional process that combines the key performance indicators which help evaluating performance,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

guarantees company management process, value creation, adjustment, speedy reaction, and enables improvement and growth of a company.

Table 1. The concept of performance evaluation

Author	Definition
Neely, Gregory, Platts (1995)	The process of quantifying the effectiveness and the efficiency of actions with a set of metrics
Marshall, Wray, Epstein, Grifel (1999)	Development of indicators and collection of data to describe, report on and analyse performance
Najmi, Kehoe (2001)	Monitoring, management and improvement of measurable criteria that tell how the tasks were fulfilled and motivate to perform in order to achieve the goals of the company
Moullin (2007)	The organization management quality rating and determination of value for customers and other interested parties.
Klovienė (2012)	A broad and multifunctional process combining key performance indicators to help evaluate business performance, ensuring management process, value creation, adaptability and quick reaction, helping the company to improve and grow.
Choong (2013)	It is concerned with improvement in which its implementation requires target or goal, so that measurement and evaluation ca be made against appropriate benchmark
Peleckis (2013)	A clock showing the current business situation and trends in its development, helping the company to decide where to go

Source: made by the authors

Under dynamic business environment, performance control plays an especially significant role, thanks to which one can observe ongoing changes and timely react to them. For a long time, performance evaluation has been conducted based on financial activity information by analysing indicators of profitability, liquidity, solvency and other financial ones. Such an evaluation has formed a traditional view that is as well followed by businesses nowadays. On the other hand, under modern economic environment, it is more and more often that the traditional performance evaluation methods receive criticism. Christauskas et al. (2009) state that the traditional performance evaluation systems do not help solving managerial problems that arise under the context of dynamic business conditions; these systems are not capable to evaluate real factors that create a value. For this reason, the modern performance evaluation methods have a higher and higher demand in business performance evaluation.

3. The advantages of modern performance evaluation methods as compared to traditional ones

In the beginning of 21st age, formation of strategies and rising of goals for implementation of the strategy has become an inseparable part of strategic business management. Certainly, business strategies are not restricted to barely profit increase, therefore, the evaluation of performance results cannot be limited to traditional evaluation methods based on the analysis of financial performance indicators. As a counterbalance for the traditional performance evaluations systems, striving to join internal and external indicators, financial and non-financial indicators, long-term and short-term performance indicators, modern performance evaluation systems were created (Adomavičiūtė, 2011). According to Kučinskienė et al. (2015), a complex viewpoint towards adapting new strategic management principles in a company's performance processes under the period of dynamic and heavily forecasted changes should help companies properly prepare management decisions and guarantee successful continuation of their performance.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

De Toni and Toncia (2001) distinguished the essential differences between traditional and modern performance evaluation systems (see Table 2). According to these authors, the traditional performance evaluation systems are oriented to profit and based on performance cost and efficiency analysis. With these systems, one strives to evaluate the results of the period in the past by calculating individual financial indicators and comparing them to the defined standard values. Differently from the traditional systems, the modern performance evaluation systems are oriented to consumers and satisfaction of their needs and are based on company's created value. With these systems, one has an intention not only to evaluate results of the period in the past, but also to define reasons that led to these results and to foresee steps to improve the future results. For this purpose, not individual indicators, but sets of key indicators that include various crosscuts of performance are evaluated.

Table 2. Comparison of the principles of traditional and modern performance evaluation methods

Traditional performance evaluation methods	Modern performance evaluation methods
Based on cost/efficiency	Value-based
Evaluate the results	Evaluate the results and its causes
Profit-oriented	Customer-oriented
Short-term orientation	Long-term orientation
Prevalence of individual measures	Prevalence of team measures
Prevalence of functional measures	Prevalence of transversal measures
Comparison with standard	Improvement monitoring
Aim at evaluating	Aim at evaluating and involving

Source: De Toni Toncia, 2001

When analysing the modern performance evaluation methods, it is worth to mention the advantages of non-financial indicators that are highlighted in the research literature (see Table 3). Lau and Sholihin (2005) state that financial indicators reach interested parties too late, information is too generalised and one-dimensional. Since financial indicators have historic nature are not detailed enough, they are only relevant in a short-term perspective. Kotane and Kuzmina (2011) have the similar opinion arguing that company's performance analysis that is based on barely evaluation of financial indicators provide insufficient information. The latter thought is based on the fact that financial indicators cannot evaluate impact of actions that are made today, since it takes time until impact of taken decisions is reflected in the financial results. Milost (2013) observes that financial performance indicators which are based on traditional record information do not indicate the real business performance picture and are not a proper base to make certain future-related decisions. In fact, financial results indicate the consequences of decisions taken in the past in numerical expression, however, they do not unfold causal factors that could lead to the given results and that could be followed when taking appropriate decisions in the future perspective.

Table 3. The advantages of non-financial performance indicators compared to financial indicators

Financial indicators	Non-financial indicators
Reflect decisions made in the past	Reflect decisions made during the current period
Aggregated performance information	Details of the current position and growth potential
Short-term perspective	Long-term perspective
Do not disclose causal relations	Disclose causal relations
Sensitive to external factors	Reflect the impact of internal factors

Source: made by the authors based on Ittner et al., 2000, Lau et al., 2005, Kotane et al., 2011, Milost, 2013

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

Before taking certain decisions, it is important that business managers, who intend to pursue strategic goals, foresee the impact that the decisions will have on the future results and timely make corrections when noticing that performance results tend to go to the wrong direction. Since non-financial indicators are more sensitive for the impact of today's decisions, it is expected that decision impact will be reflected earlier in non-financial results than in financial indicators. Research shows that non-financial performance indicators positively affect financial performance results and non-financial indicators are better indicators for future financial results than historic financial data. Moreover, non-financial indicators reflect company's economic position and growth possibilities better than financial company performance indicators provided in the reports (Kotane et al., 2011). As well, it is worth noting that financial results depend not only on how company performs its activity, but they are also responsive to the impact of external factors. To achieve the best performance results, managers must know how much of success is impacted by their actions and whereto they must add more efforts to improve results. Since non-financial indicators are less sensitive to external factors, they do better reflect the impact of the actions, which are taken in the company, on its success and can provide more detailed information about the effect of taken decisions on final results (Ittner et al., 2000).

Milost (2013) notices that for taking future decisions the economists perceive increasingly the inappropriateness of traditional record information; therefore, an increasing interest in the non-financial performance indicator systems is observed. Certainly, a majority of the authors in the literature agree on that in the performance evaluation one cannot rely barely on non-financial information and it has to be evaluated together with the financial indicators, since it merely supplements the financial information by explaining certain relationships that are not explained in traditional record (Cardinaels et al., 2010; Milost, 2013; Kotane, 2015; Ahmad et al., 2016).

4. Comparison of modern company performance evaluation methods

After conducting research literature analysis on the topic of business evaluation systems (Tangen, 2004, Gimžauskienė, 2007, Christauskas et al., 2009, Cardinaels et al., 2010, Adomavičiūtė, 2011, Peleckis et al., 2013, Bajus et al., 2014, Makutėnaitė et al., 2014, Bititci, 2015, Kučinskienė et al., 2015, Bhasin, 2017, Chouhan, 2017), the authors suggest the classification scheme of performance evaluation methods (see Figure 1), where the methods are classified into smaller groups according to method contents and performance evaluation purpose. According to this scheme, performance evaluation methods are first of all classified into traditional and modern ones. Traditional performance evaluation methods, as it was mentioned earlier, include analysis of financial performance results and their relative values. In the opinion of the authors of this paper, modern evaluation methods have to be split up into the following six groups of methods:

1. Performance record (accounting) methods. It is accounting data-based performance evaluation methods that calculate the financial value created by performance.
2. Quality management concept methods. It is performance evaluation methods that are based on the conception of total quality management. The purpose of these methods is to evaluate how the companies keep up with the requirements, what progress they do when improving their performance, and similar.
3. Causal relationship theory models. It is performance evaluation models that distinguish the main factors which affect the successful performance.
4. Business process evaluation models. It is models that emphasize processes during performance evaluation. The purpose of these models is to evaluate economy of performance and efficacy during the separate steps of the process.
5. Balanced system models. They are overall models of performance evaluation that are closely related to company's vision and strategy. They involve both financial and non-financial performance evaluation indicators and reflect the results in different performance perspectives.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

6. Multicriteria methods. It is complex performance evaluation methods that join many relevant performance indicators into a single summarising performance estimator.

Following the above-mentioned research papers, it is observed that out of all performance evaluation methods that are distinguished in the classification scheme, the most popular and most widely employed are the following ones: economic value added (EVA), balanced scorecard (BSC), performance prism, performance pyramid, six sigma, and multicriteria performance measurement.

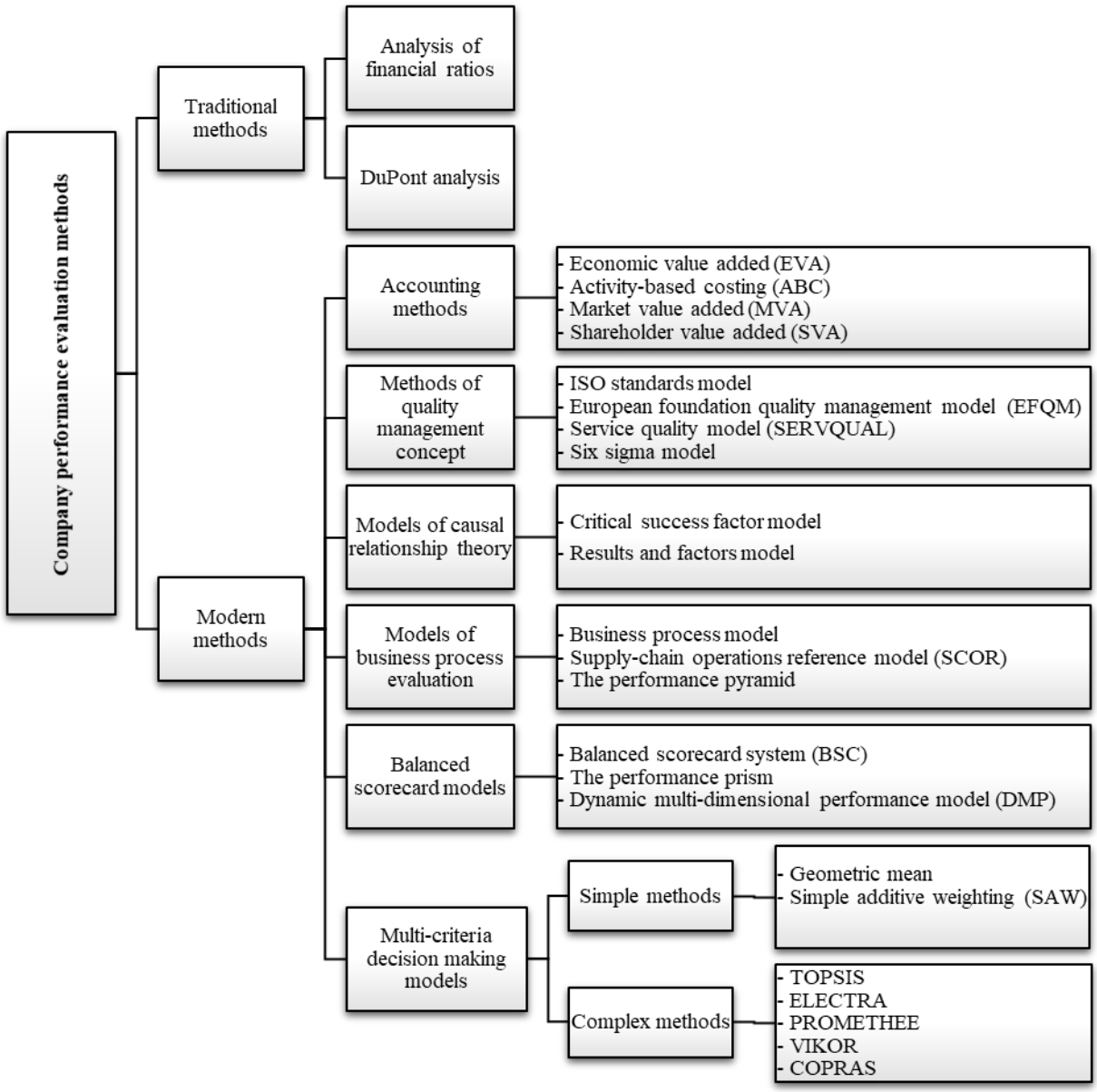


Fig.1. Classification scheme for performance evaluation methods

Source: made by the authors based on Tangen, 2004, Gimžauskienė, 2007, Christauskas et al., 2009, Cardinaels et al., 2010, Adomavičiūtė, 2011, Peleckis et al., 2013, Bajus et al., 2014, Makutėnaitė et al., 2014, Bititci, 2015, Kučinskienė et al., 2015, Bhasin, 2017, Chouhan, 2017)

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

Economic value added (EVA) method that was created in 1990 by consultant company "Stern Stewart & Co." is one of the most widely used financial indicators which allows evaluating company performance in a generalised way (Adomavičiūtė, 2011) and which with increasing frequency is applied in global companies as the main performance result evaluation measure (Makutėnaitė et al., 2014). The EVA method is substantiated by accounting data and is calculated as a difference between net operating profit after taxes and cost of invested capital:

$$EVA = NOPAT - IC \times WACC,$$

here NOPAT – net operating profit after taxes
IC – invested capital
WACC – weighted average capital cost.

The EVA indicator shows, whether company's income was larger than the expected expenditures and capital costs during the analysed period. The higher value of the indicator shows better performance results; this increases the possibility of paying out larger dividends and higher stock market price (Bhasin, 2017). EVA fosters the efficient usage of the capital – both borrowed one and the private (Makutėnaitė et al., 2014). This method allows evaluating economic profit, quality of evaluation decisions and performance of all managers and employees. This enables determining creation of value for future periods as well as motivating staff. It is worth mentioning that this method can be applied not only for the entire company, but also for its single department, production line or a smaller production unit, confirming the contribution of each business chain unit when creating value of the company.

Balanced scorecard (BSC) was created in 1992 by two researchers of Harvard University, namely R. S. Kaplan and D. P. Norton. It is a multi-dimensional system, the purpose of which is to describe, implement and manage the strategy of the company in all its levels (Christauskas et al., 2009). According to Adomavičiūtė (2011), it is a performance evaluation model which allows, by using the causal relationship concept, connecting performance indicators with receivable benefits and ensures transformation of the strategy to specific goals and actions. The core of the BSC method is grouping of the key performance indicators that are related to company's strategy into four perspectives which provide answers to the following significant questions (Kaplan et al., 1996):

- Finances: how the company should look like to its shareholders that the financial success would accompany it.
- Clients: how the company has to look like to its clients that its vision would be implemented.
- Internal processes: which business processes the company should improve that it would satisfy its shareholders and clients.
- Learning and growth: how the company will keep the ability to change and improve itself that its vision would be implemented.

So, BSC allows presenting financial and non-financial performance indicators together: first ones as grouped into a single financial perspective and latter ones as grouped into a client perspective, internal processes perspective, and learning and growth perspective (Cardinaels et al., 2010). In the opinion of the authors of this method, non-financial indicators by a huge extent determine financial performance results.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

This method received a huge attention of companies worldwide and regarding its advantages became a popular tool of performance evaluation and strategic management. A close relationship of performance indicators with performance vision and strategy is considered to be the key advantage of the method. Since the system of balanced scorecard connects the most significant internal and external performance indicators, the strategy of the company is transmitted in a clear and understandable way for the all staff members; this motivates employees to achieve the goals of the company. Moreover, since the questions that are raised by the BSC system perspectives are focused on the future, this method acquires an advantage against other methods which are substantiated only by historical data. In any case, the problem of constructing a set of key indicators is highlighted in the research literature, as it is not unambiguously decided which specific indicators have to be analysed so that the best result of the system would be achieved. Therefore, the implementation and realisation of the system becomes to a complex process of a company that requires a lot of time and knowledge, and often huge finances.

Performance prism model was created in 2001 by the researchers of Great Britain A. Neely, C. Adams and M. Kennerly. Its purpose is to evaluate company's performance through five perspectives: strategies, possibilities, processes, satisfaction and contribution of interested groups. According to Chrisauskas et al. (2009), the model is unique in distinguishing the area of evaluation that was not distinguished in previous models, namely the contribution of interested groups to company's success.

The authors of the model provide explanations of each perspective (Neely et al., 2002). The first perspective, satisfaction of interested parties, should answer who the interested individuals of the company are and what their needs are. Consumers, employees, suppliers, investors, among others, can be interested parties; and one of the main objectives of a company is to create value for them. The other significant perspective, contribution of interested parties, should answer what company needs are from the point of view of interested groups. When creating value for interested individuals, the feedback is important for the company, e.g., loyalty, profitability, productivity, creativity, etc. When having the answers to the latter questions, the third perspective of the performance prism, called strategies, is important. The question raised to this perspective deals about what company's strategy should be so that needs and expectations of both interested parties and company itself would be satisfied. Furthermore, when the strategy is defined, one can switch to the perspective of processes, where decisions on which processes are needed for implementation of the strategy are taken. Finally, the perspective of possibilities should answer which abilities (groups of people, practice, technologies, infrastructure, etc.) are needed for the company so that implementation of processes would as productive as possible. So, the structure of the model indicates that when defining performance tools, it is incorrect to barely follow the strategy; first of all, needs and expectations of interested parties must be purged (Neely et al., 2002).

The fact the performance prism model distinguishes a unique area of evaluation, namely the contribution of interested groups to organisational success, is considered to be the main advantage of the model. In this way, when evaluating business performance, all interested parties are concerned. Moreover, the requirement to discuss and substantiate the organisational strategy and only afterwards choose performance evaluation indicators is considered to be a no less important strength of the model. Despite of these advantages of the model, two main disadvantages are indicated in the research literature. First of all, it is argued that in the existing company performance evaluation system the application of this model is difficult; therefore, it must be implemented as a separate system. Moreover, similarly to the most of other evaluation methods, the performance prism does not evaluate all organisational success factors.

Performance evaluation pyramid was suggested in 1989 by the authors of the USA K. F. Cross and R. L. Lynch. It is a system, the purpose of which is to connect the organisational strategy with its activities (Tangen, 2004). When applying this method, the goals for implementing the company's vision are raised for each hierarchical level from top down to bottom and the measures for reaching these goals are defined from bottom up

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

to top. According to Adomavičiūtė (2011), it is beneficial when defining how organisational goals communicate ranging downwards and how the measures can make impact when going upwards by different levels of the organisation.

In the opinion of Tangen (2004), when forming the performance evaluation pyramid, first of all, company's strategy and vision must be defined. In the second hierarchical level, company's vision is transformed to the goals of business units, which are formed as short-term ones and are related to company's profitability and cash flows, and long-term ones, which are related to the growth and position in the market. To achieve these goals, the goals in the third hierarchical level are related to magnification of client satisfaction, flexibility and productivity. Finally, in the fourth level of the pyramid, business operation system indicators are split up to indicators of work centres, observed day by day: the quality, delivery, production cycle time and costs.

Such a hierarchical view to performance evaluation, which is related to the analysis of processes, is considered as one of the main advantages of performance evaluation pyramid. The other strength of this method is the integrity of business goals to the observed performance result indicators. Unfortunately, it is not defined which specific indicators should be observed when applying this method, therefore, the problem of identification of a set of performance indicators pyramid appears in the performance evaluation.

The method of six-sigma was created in 1986 in "Motorola" company in order to solve quality problems. It is worth noting that the title of this method, six sigma, means that there is 3.4 defects out of one million produced items; this does not make even 0,001 per cent, so it means that it is a nearly ideal process of production. Drohomeretski et al. (2014) explain that it is a business improvement strategy by which one seeks to identify and eliminate disadvantages of business processes and the reasons of mistakes, by concentrating attention to performance related to satisfaction of consumer needs. Gupta (2005) states that the majority of evaluation systems are strategic and do not go down to process management; meanwhile, the six-sigma method was created in order to evaluate all work aspects of an organisation. This system, which embodies leadership and management, consistently combines purchases and production, promotes services and sales, supports mastership of employees, introduction of innovations and comprehensive progress (Gupta, 2005).

The practical application of the six-sigma method is based on the methodology of five phases: definition, measurement, analysis, improvement and control (DMAIC) (Gupta, 2005, Mast et al., 2012). During the first step, definition, the problem must be clearly defined, i.e., including client expectations, company goals, teams and their responsibilities, resources, process and the lowest boundary of efficiency of the process. Furthermore, in the phase of measurement, the defined problem is presented in a measurable form, i.e., indicators, which are proper for measurement, are distinguished; data is collected; as well as means, standard deviations, etc. are calculated by using statistical methods. In this way, the results of current performance are evaluated and the goals for improvement of performance results are raised. Having the necessary information, the analysis is conducted. In this phase, the attention is focused on search of the essential impact factors and reasons which determine bad work or production quality results (defects). When this is clarified, in the phase of improvement, by doing testing one seeks to find out decisions for improvement of processes so that defects are eliminated. Finally, the phase of control is reached where the improved processes must be controlled and the six sigma initiative must be maintained, so if deviations and increasing number of defects are noticed, one should again return to the phase of definition and to repeat the cycle once again.

One of the advantages of this method is efficiency when saving funds of an organisation; one should only need to detect defects in time and take actions for the process of their elimination. The six sigma method is increasingly introduced in companies; it is liked because of a clear and universal system. Moreover, the significant particularity of the system is namely evaluation of all aspects of organization and application of statistical

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

methods when evaluating its performance. It is also stated that this method acquires an advantage against other methods, since it has a strong focus on the satisfaction of client needs. Unfortunately, this advantage raises a threat that the significant quality control indicators might be uninvolved in the evaluation. Besides, as it is common for the majority of performance evaluation methods, the problem of a set of observed performance indicators is considered to be the main disadvantage of the method, since it is not defined which specific indicators must be observed.

The purpose of **the model of multicriteria company performance measurement** is to complexly evaluate company's performance results, taking into account the majority of significant performance indicators. In the research literature, it is observed that when conducting performance result evaluation by following analysis of a few significant indicators, the conclusion making and decision making can become to some extent chaotic: the value of one indicator can be better, the value of other indicators can be worse, however, at the end it is complicated to define, whether the performance result improved or deteriorated. For this reason, in the opinion of Peleckis et al. (2013), multicriteria performance evaluation methods can be applied, since they join single performance indicators into a single summarising indicator, which can be additive or a multiplicative combination of partial indicators. Tamašiūnienė et al. (2006) indicate that these methods can be classified into two groups: simple methods (geometric average, simple additive weighting (SAW), sum of units) and complex methods (TOPSIS, ELECTRA, PROMETHEE, VIKOR, complex proportional one, simplified complex one, etc.). It is worth noting that performance results often do not match when different methods are applied; therefore, it is suggested to construct a multicriteria evaluation model out of a few multicriteria methods (Stonkutė et al., 2016). Universality of the model is considered to be its essential advantage. The model allows evaluating quantitatively any complex phenomena that is expressed by many indicators. It is significant to evaluate as many indicators as possible so that the threath of missing important company performance evaluation aspects would be eliminated. Peleckis et al. (2013) suggest joining the analysied factors into certain groups, e.g., by distinguishing indicators of profitability, cost level, efficiency of asset employment, and usage of labour force. The universality of the model is as well expressed in that each company can adjust it according to its needs and goals of evaluation. The model involves a wide spectrum of evaluation indicators and requires much of efforts when collecting information and choosing proper multicriteria methods during construction of the model. It is observed that the identification of factor significance by determining their weights becomes a complex task. This is the reason why a company may experience huge time and financial costs.

Table 4. Comparison of modern company performance evaluation methods

Criteria	EVA	BSC	Performance prism	Performance pyramid	Six sigma	Multi-criteria evaluation	Number of methods that satisfy a criterion
Quantitative evaluation	+	+	+	+	+	+	6
Qualitative evaluation	-	+	+	+	-	+/-	3(4)
Non-financial indicators are included	-	+	+	+	+	+/-	4(5)
Specific indicators are measured	+	-	-	-	-	-	1
Activity evaluation is generalized	+	-	-	-	-	+	2
Linked to the company's strategy	-	+	+	+	-	+/-	3(4)
A look forward to the future	+	+	+	+	-	+/-	4(5)
Simple, low cost	+	-	-	-	-	-	1
Meeting customers' needs	-	+	+	+	+	+/-	4(5)
Employee motivation	-	+	+	+	+	+/-	4(5)
Process analysis	-	+	+	+	+	+/-	4(5)
Number of criteria the method satisfies	5	8	8	8	5	2(9)	

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(10)

Source: made by the authors

To summarise the review of company performance evaluation methods, the comparison of the methods is conducted following the criteria of the company performance evaluation systems that are distinguished by the authors of this paper (see Table 4). It can be concluded that there is no single performance evaluation method that would be the most fitable to all companies; the choice depends on the organisational needs and evaluation goals. It is observed that all performance evaluation methods are based on the quantitative evaluation, however, specific indicators that must be measured for evaluating performance results are provided in the EVA method exclusively, which does not involve non-financial information. For this reason, when choosing methods that involve non-financial indicators into evaluation, the challenge of forming a set of indicators is faced; this determines a complex, time consuming and finance requiring introduction of the method to organisational management system. On the other hand, contrary to the traditional financial performance evaluation methods, in the majority of the modern methods, satisfaction of client needs, employee motivation and perspectives of process analysis are distinguished; this allows evaluating performance results complexly. It is worth noting that the system of balanced scorecard, performance prism and performance evaluation pyramid satisfies most of the criteria needed for the complex performance evaluation: it relates performance evaluation and the required indicators with the organizational strategy so that this allows evaluating factual results and, focusing to the future, taking management decisions that will help achieving long-term goals of the company. In the opinion of the authors of this paper, it is worth drawing attention to the method of multicriterial performance evaluation, which, as compared to the other methods, is the most universal, satisfying from two to nine criteria needed for the complex performance evaluation, and which is especially flexible, when considering organizational needs and evaluation goals.

Conclusions

In the research literature, a company's performance evaluation is defined as a wide and multifunctional process which joins all its significant performance indicators in a way that allows it evaluating performance, enables a constant company management process, value creation, adjustment, and fast reaction that leads to improvement and growth of the company.

Research literature allows distinguishing the key advantages of non-financial indicators as opposed to financial indicators. The non-financial indicators may reflect the effect of currently made decisions, they unfold causal relationships between factors and final results, provide detailed information about company's current position and growth possibilities. The non-financial indicators are closely related with the long-term goals of an organization, so they are better indicators of the financial results in the future. It is worthy to note that the non-financial information is considered to be a compliment of the financial information; therefore, company's performance evaluation should not focus on barely financial indicators.

A company's performance evaluation methods can be grouped into two categories: traditional methods that are justified only by the analysis of financial indicators and modern ones that combine the company's financial and non-financial performance information and allow evaluating its activity both quantitatively and qualitatively. The most popular modern company's performance evaluation models are considered the following ones: economic value added method, balanced scorecard, activity prism, activity evaluation pyramid, six sigma model and multi-criteria model.

There is no single performance evaluation method that would be appropriate for all companies; the method should be chosen individually considering the aim of the evaluation and the needs of the company.

There can be established a multi-criteria performance evaluation model that would satisfy the needs of a particular business' activity and targets for evaluation. So the further research can be targeted at establishing model like this for manufacturing companies by identifying a set of specific key performance indicators and their impact on performance results.

References

Abdel-Maksoud A., Dugdale D., Luther R. (2005). Non-financial performance measurement in manufacturing companies. The British Accounting Review. Vol. 37, p. 261-297. https://doi.org/10.1016/j.bar.2005.03.003

Adomavičiūtė D. (2011). Muitinės audito modelis verslo įmonių veiklos vertinimui: daktaro disertacija [Customs Audit Model for Evaluation of Business Activities: Doctoral Dissertation]. p. 76-90. Vilnius: Vilniaus universitetas, Socialiniai mokslai, Vadyba ir administravimas.

Ahmad K., Zabri S. M. (2016). The effect of non-financial performance measurement system in firm performance. International Journal of Economics and Financial Issues. Vol. 6 (S6), p. 50-54. Retrieved from: https://www.researchgate.net/publication/309008537

Bhasin M. (2017). A study of economic value added disclosures in the annual reports: is EVA a superior measure of corporate performance? East Asian Journal of Business Economics. Vol. 5 (1), p. 10-26. https://doi.org/10.20498/eajbe.2017.5.1.10

Bititci U. S. (2015). Overview of popular performance measurement models and frameworks. Managing Business Performance: The Science and the Art. p. 251 – 262. Padstow: TJ International Ltd. https://doi.org/10.1002/9781119166542

Cardinaels E., van Veen-Dirks P. M. G. (2010). Financial versus non-financial information: The impact of information organization and presentation in a Balanced Scorecard. Accounting, Organizations and Society. Vol. 35, p. 565-578. https://doi.org/10.1016/j.aos.2010.05.003

Choong K. K. (2013). Understanding the features of performance measurement system: a literature review. Measuring Business Excellence. Vol. 17 (4), p. 102-121. https://doi.org/10.1108/MBE-05-2012-0031

Chouhan V., Soral G., Chandra B. (2017). Activity based costing model for inventory valuation. Management Science Letters. Vol. 7 (3), p. 135-144. doi:10.5267/j.msl.2016.12.003

Christauskas Č., Kazlauskienė V. (2009). Modernių veiklos vertinimo sistemų įtaka įmonės valdymui globalizacijos laikotarpiu. Ekonomika ir vadyba. Nr. 14, p. 715-722. Retrieved from: http://verslokelias.eu/resursu_katalogas/content/article/kitos%20publikacijos/2%20kitos%20publikacijos%20nr%204.pdf

De Toni A., Tonchia S. (2001). Performance measurement systems – Models, characteristics and measures. International Journal of Operations & Production Management. Vol. 21 (1/2), p. 46-71. https://doi.org/10.1108/01443570110358459

Drohomeretski E., Costa S. E. G., Lima E. P., Rosa Garbuio P. A. (2014). Lean, six sigma and lean six sigma: an analysis based on operations strategy. International Journal of Production Research. Vol. 52 (3), p. 804-824. https://doi.org/10.1080/00207543.2013.842015

Europos Parlamento ir Tarybos direktyva 2014/95/ES. Europos Sąjungos oficialusis leidinys, L 330. Nr. 57, p. 1-9, 2014. Retrieved from: http://data.europa.eu/eli/dir/2014/95/oj

Franceschini F., Galetto M., Turina E. (2013). Techniques for impact evaluation of performance measurement systems. International Journal of Quality & Reliability Management. Vol. 30 (2), p. 197-220. https://doi.org/10.1108/02656711311293599

Gimžauskienė E. (2007). Organizacijų veiklos vertinimo sistemos: monografija. [Organizations' evaluation systems: monograph] Kaunas: Technologija

Gupta P. (2005). Šešios sigmos verslo sėkmei valdyti [Six Sigma for Business Success Management]. Vilnius: Vaga.

Ittner C., Larcker D. (2000). Non-financial performance measures: what works and what doesn't. Knowledge@Wharton. The Wharton School, University of Pennsylvania. Retrieved from: http://knowledge.wharton.upenn.edu/article/non-financial-performance-measures-what-works-and-what-doesnt/

Jasiukevičius L., Christauskas Č. (2011). The Application of performance measurement system at the electricity sector of Lithuania. Inžinerinė Ekonomika. Nr. 22 (3), p. 283-291. https://doi.org/10.5755/j01.ee.22.3.518

Kaplan R. S., Norton D. P. (1996). Using the Balanced Scorecard as a Strategic Management System. Harvard Business Review. Vol. 74 (1), p. 75-85.

Klovienė L. (2012). Veiklos vertinimo sistemos adekvatumas verslo aplinkai: daktaro disertacijos santrauka. Kaunas: Kauno technologijos universitetas, Socialiniai mokslai, Vadyba ir administravimas.

Kotane I. (2015). Evaluating the importance of financial and non-financial indicators for the evaluation of company's performance. Management Theory and Studies for Rural Business and Infrastructure Development. Vol. 37, No. 1, pg. 80-94. https://doi.org/10.15544/mts.2015.08

Kotane I., Kuzmina-Merlino I. (2011). Non-financial indicators for evaluation of business activity. European integration studies. Research and Topicalities. No. 5, p. 213-219. Retrieved from: http://www.eis.ktu.lt/index.php/EIS/article/view/1099/

Kotane[I., Kuzmina-Merlino I. (2012). Assessment of financial indicators for evaluation of business performance. European integration studies. Research and Topicalities, No. 6, p. 216-224.Retrieved from: http://www.eis.ktu.lt/index.php/EIS/article/view/1554/1597

Kučinskienė M., Fominienė A. (2015). Kompleksinis požiūris į viešojo valdymo institucijų veiklos vertinimą [Complex approach to evaluation of activity of public organizations]. Accounting, Audit, Analysis: Science, Studies and Business Synthesis. p. 151-165. Vilnius: Vilniaus universiteto leidykla

Lau C. M., Sholihin M. (2005). Financial and nonfinancial performance measures: How do they affect job satisfaction? The British Accounting Review. Vol. 37, p. 389-413. doi:10.1016/j.bar.2005.06.002

Lynch R. L., Cross K. F. (1991). Measure Up! Yardsticks for continuous improvement. Cambridge: Basil Blackwell.

Makutėnaitė J., Gliaubicas D., Makutėnienė D. (2014). Ekonominės pridėtinės vertės metodo tinkamumas įmonės vertei nustatyti [The appropriateness of the economic added value method for determining the company's value]. Apskaitos ir finansų mokslas ir studijos: problemos ir perspektyvos. Nr. 1 (9), p. 137-145. https://doi.org/10.15544/ssaf.2014.15

Mast J., Lokkerbol J. (2012). An analysis of the Six Sigma DMAIC method from the perspective of problem solving. International Journal of Production Economics. Vol. 139 (2), p. 604-614. https://doi.org/10.1016/j.ijpe.2012.05.035

Milost F. (2013). Information power of non-financial performance measures. International Journal of Business Management and Economic Research. Vol. 4 (6), p. 823-828. Retrieved from: http://www.ijbmer.com/vol4issue6.php

Modi S. (2016). A review on the literature of value relevance of nonfinancial variables or information. International Journal of Advance Research in Computer Science and Management Studies. Vol. 4 (2), p. 81-85. Retrieved from: http://www.ijarcsms.com/February2016.htm

Moullin M. (2007). Performance measurement definitions: Linking performance measurement and organisational excellence. International Journal of Health Care Quality Assurance. Vol. 20 (3), p. 181-183. https://doi.org/10.1108/09526860710743327

Najmi M., Kehoe D. F. (2001). The role of performance measurement system in promoting quality development beyond ISO 9000. International Journal of Operations & Production Management. Vol. 21 (1/2), p. 159-172. https://doi.org/10.1108/01443570110358512

Neely A., Adams C., Kennerley M. (2002). The performance prism: the scorecard for measuring and managing business success. Financial Times Series. Financial Times/Prentice Hall.

Peleckis K., Krutinis M., Slavinskaitė N. (2013). Daugiakriterinis alkoholio pramonės įmonių pagrindinės veiklos efektyvumo vertinimas. [Multivariate assessment of the main activities of the alcohol industry], Verslo ir teisės aktualijos. Nr. 8, p. 1 – 16. https://doi.org/10.5200/1822-9530.2013.1

Slatkevičienė G., Vanagas P. (2001). Veiklos kompleksinio vertinimo sistema: sudarymo teorija ir metodai: monografija [Veiklos kompleksinio vertinimo sistema: sudarymo teorija ir metodai: monografija]. Kaunas: Technologija.

Stonkutė E., Tamulevičienė D. (2016). Daugiakriterinio vertinimo modelio taikymas nustatant statybos įmonių grupių finansinę būklę. [Application of multicriteria assessment model for determining the financial condition of construction companies]. VU EF studentų mokslinės draugijos konferencjos straipsnių rinkinys 2016. p. 250-259. Vilnius: Vilniaus universiteto leidykla.

Tamošiūnienė R., Šidlauskas S., Trumpaitė I. (2006). Investicinių projektų efektyvumo daugiakriterinis vertinimas. Verslas: Teorija ir Praktika. Vol. 7 (4), p. 203-212.

Tangen, S. (2004). Performance measurement: from philosophy to practice. International Journal of Productivity and Performance Management. Vol. 53 (8), p. 726-737. https://doi.org/10.1108/17410400410569134

Жегалина А. С. (2016). Достоинства и недостатки сбалансированной системы показателей [Advantages and disadvantages of a balanced system of indicators]. Economic Theory and Business Process. Vol. 10 (19), p. 31-32.

Judita NARKUNIENĖ, MSC in Business Economics, Vilnius University, Faculty of Economics and Business Administration, Business Department. Research interests: business finance, business process management, strategic management, company performance evaluation, econometric analysis.
ORCID ID: orcid.org/0000-0002-9880-1003

Aurelija ULBINAITĖ is an Associate Professor at Vilnius University, Faculty of Economics and Business Administration, Business Department, from where she received her PhD degree in Management and Administration, Social Science, in 2012. Since 2013, she is a member of the Lithuanian Society of Young Researchers. Her teaching curriculum involves Business Diagnostics, Business Integrational Processes, Business Operation Seminar, Service Process Management, International Trade of Services, and Insurance Process Management. She has participated in research projects funded by Taiwan's Ministry of Foreign Affairs, Taiwan's Ministry of Education, and the Estonian Institute. Research interests: business process management, company performance evaluation, decision making, consumer behaviour, risk management and insurance, service industry, service marketing, European and Asian socio-economic and cultural values.
ORCID ID: orcid.org/0000-0001-5025-7240

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

Publisher

EVALUATION OF ACCOUNTING REGULATION EVOLUTION IN SELECTED COUNTRIES

Rasa Subačienė[1], Lehte Alver[2], Inta Brūna[3], Mirjana Hladika[4], Daša Mokošová[5], Jan Molín[6]

[1] *Vilnius University, Universiteto 3, Vilnius, LT-01513, Republic of Lithuania*

[2] *Tallinn University of Technology, Ehitajate tee 5, Tallinn 19086, Estonia*

[3] *University of Latvia, Aspazijas bulv.5, Riga, LV 1050, Latvia*

[4] *University of Zagreb, Trg Republike Hrvatske 14, 10000 Zagreb, Croatia*

[5] *University of Economics in Bratislava, Dolnozemská cesta 1/b, 852 35 Bratislava, Slovak Republic*

[6] *University of Economics, Prague, nám. W. Churchilla 1938/4, 130 67 Praha 3, Czech Republic*

E-mails: [1]rasa.subaciene@evaf.vu.lt; [2]lehte.alver@ttu.ee; [3]inta.bruna@lu.lv; [4]mhladika@efzg.hr; [5]dasa.mokosova@euba.sk; [6] jan.molin@vse.cz

Received 10 March 2018; accepted 20 March 2018; published 30 September 2018

Abstract. Accounting forms a significant part of information on any enterprise and plays the most important role in different levels of enterprise' management as well as in country's. Accounting information is used by various information users, whose decisions may influence various spheres: from performance of enterprises to proceeding the state policy. Its role increased recently under conditions of modern global and competitive market economy, and will be increasing in the future. Importance of accounting information usage highlights the need of appropriate formation of such information. And accounting regulation plays the main role in the process of formation and presentation of accounting information as it determines requirements for accounting methodology, information performed in the single set of financial statements or consolidated financial statements. The purpose of the research is to evaluate evolution of accounting regulation for the period 1990 – 2017 and distinguish accounting regulation evolution phases and factors, which influenced development of the phases. Six countries, which are members of the European Union – the Republic of Croatia, the Czech Republic, the Republic of

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Estonia, the Republic of Latvia, the Republic of Lithuania and the Slovak Republic - were chosen for the evaluation of accounting evolution. For the research were used legislation analysis, systematisation, inductive and deductive, comparison and summary of information methods. Research results show, that evolution of accounting regulation in analysed countries may be distinguished in four general phases. The period of evolution started at the beginning of nineties (1990–1992) when the countries transformed from a central planned economy to market economy, this phase was followed by other phases (1993–2001–2005), when laws on accounting and additional legislation were issued. Accounting regulation evolution phase for alignment accounting legislation with Fourth and Seventh EU Directives started from 2002/2006 and the phase of the compliance with requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013, which started in all analysed countries in 2016, except Slovakia – in 2014, completes the accounting regulation evolution period till present.

Keywords: accounting; development of accounting; accounting regulation; the Republic of Croatia; the Czech Republic; the Republic of Estonia, the Republic of Latvia; the Republic of Lithuania; the Slovak Republic

Reference to this paper should be made as follows: Subačienė, R.; Alver, L.: Brūna, I.; Hladika, M.; Mokošová, D.; Molín, J. 2018. Evaluation of accounting regulation evolution in selected countries, *Entrepreneurship and Sustainability Issues* 6(1): 140-175. http://doi.org/10.9770/jesi.2018.6.1(11)

JEL Classifications: M41

1. Introduction

Accounting forms a significant part of information on any enterprise and plays the most important role in different levels of enterprise' management as well as in country's. Accounting information is used by various information users, whose decisions may influence various spheres: from performance of enterprises to proceeding the state policy. Its role increased recently under conditions of modern global and competitive market economy, and will be increasing in the future (Strichko, 2013; Paseková et al., 2018, Kunitsyna et al., 2018). Importance of accounting information usage highlights the need of appropriate formation of such information. And accounting regulation plays the main role in the process of formation and presentation of accounting information as it determines requirements for accounting methodology, information performed in the single set of financial statements or consolidated financial statements.

The purpose of the research is to evaluate evolution of accounting regulation for the period 1990 – 2017 and distinguish accounting regulation evolution phases and factors, which influenced development of the phases. Six countries, which are members of the European Union – the Republic of Croatia, the Czech Republic, the Republic of Estonia, the Republic of Latvia, the Republic of Lithuania and the Slovak Republic – were chosen for the evolution of accounting evolution. For the research all available countries, which joined European Union from 1the of May, 2004 and The Republic of Croatia, which became a member of EU at latest terms, were selected. For the research were used legislation analysis, inductive and deductive, information's systematisation, comparison and summary methods.

2. Research methodology

The research methodology of evaluation of accounting regulation evolution is presented in the Figure 1.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

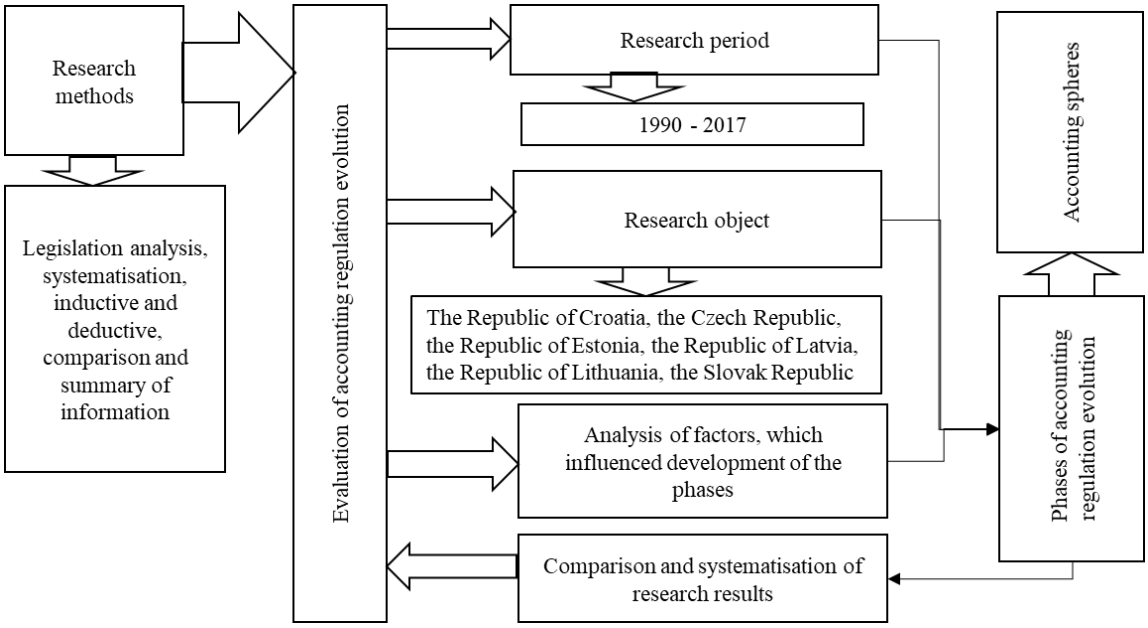


Fig. 1. Research methodology

As Figure 1 shows the research methodology consists of several stages. Research period includes 1990-2017 years. For the research object were chosen six countries: The Republic of Croatia, the Czech Republic, The Republic of Estonia, the Republic of Latvia, the Republic of Lithuania, the Slovak Republic. The Republic of Estonia, the Republic of Latvia, the Republic of Lithuania were chosen for the research as these countries have quite similar economic, political and culture background, and started their development at the same conditions. The same reasons were applied for the Czech Republic and the Slovak Republic. All mentioned countries are members of the European Union from 1 May 2004. The Republic of Croatia joined the European Union on 1 July 2013 and was chosen for research purpose as indicator of hypothesis approvement. Under the research phases of accounting regulation evolution by accounting spheres are distinguished, factors, which made impact for development of phases, are analysed, hypothesis, that newly formed, independent European countries accounting development depends on accession to the European Union was raised, and comparison and systematisation of research results are presented.

3. Evolution of accounting regulation in Croatia

Since Croatia gained its independence in 1991 (October 8th), a reform of ownership and economy has started. Reform processes required significant changes of legal and institutional framework in order to satisfy the transition from social (state) to a private ownership, and for the purpose of development of democracy and free market economy system. In that new business environment most social (state) business entities turned into join-stock companies in a private ownership. Furthermore, many new small and medium-sized companies were established in that period. Inherited institutional infrastructure couldn't satisfy requirements for conducting a business in that new business environment and it required significant changes and modifications. In whole institutional infrastructure, significant part concern to the accounting regulation. New accounting regulation has to be adjusted to a private ownership and financial markets.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

First phase of accounting regulations includes the period from gaining the independency till the end of 1992. In that period accounting was regulated by the Law on Accounting (1991). Actually, this law was the last Law on Accounting enacted and implemented in former Yugoslavia in 1989. Key characteristic of the accounting system in that period was the singular system of financial reporting (Gulin et al., 2003). That means that financial statements of all business entities have to be submitted to the state institution Social bookkeeping service (Služba društvenog knjigovodstva) which has the role of proprietary authorities and oversight. The evidence of business transactions was based on double-entry bookkeeping and on prescribed chart of accounts. Such requirements ensured unified financial statements, and the indicator of business success was profit which was determined as a difference between total revenues and total expenses. Business entities submitted their financial statements into court register. This phase of accounting regulations is marked with insufficient legislation in order to establish quality accounting system, and the comprehensive framework for transition from social to market economy was not developed.

Second phase of accounting regulations started in 1993 with the implementation of first Law on Accounting (1992) that has been prepared and adopted in independent Croatia (see Table 1). This Law on Accounting didn't prescribed chart of accounts, and it permitted each business entity to develop its own chart of accounts in accordance with its specific needs. The content (elements) of financial statements (only balance sheet and profit and loss account) for all business entities (for entrepreneurs, banks and other financial institutions, insurance companies) was prescribed and it was aligned with the Fourth (78/660/EEC) EU directive. The aim of financial reporting was to present faithful and relevant information for all users of financial statements. Crucial change that was implemented through this Law on Accounting includes the implementation of International Accounting Standards for all (listed and non-listed) entities. Furthermore, this Law introduced the implementation of dual system of financial reporting (Gulin et al., 2003). That means, business entities prepared one set of financial statements for external users (such as shareholders, creditors), and the other set of financial statements for state institutions (such as tax authorities). The obligation to prepare the consolidated financial statements was prescribed by this Law on Accounting. Comparing the previous accounting system and procedures with this one it can be seen significant switch in order to strengthen the quality of financial reporting and use of accounting information for all users. Furthermore, by this Law has been established the Croatian Board for Accounting and Accounting Standards. The purpose of this Board was to monitor, coordinate and explain the implementation of International Accounting Standards. This phase of accounting regulations ended at the end of 2005. It is important to highlight that during this phase the Company Law (1993) was enacted (and it is valid till today, but it was amended 12 times). In Company Law was included the provisions on responsibility for conduction of financial books, for preparation of financial statements and for decision making on profit use. The Law on registry of annual financial statements (2003) prescribed the obligation for all business entities that have to pay profit tax to submit their financial statements into Registry which is conducted by Financial agency.

Next phase of accounting regulations is developed in accordance with the integration processes of Croatia into the European Union. This phase started with the implementation of second Law on Accounting (2005). The main changes that were implemented by this Law include the new classification of business entities (small, medium and large), new (longer) deadlines for keeping the financial books and bookkeeping documents, and the new set of annual financial statements. Oversight authorities for business entities (entrepreneurs, banks, insurance companies etc.) are authorized to prescribe the content and structure of financial statements for certain type of business entity. The content and structure of financial statements for entrepreneurs are defined in Ordinance on the structure and content of annual financial statements (2008). Since 1 January 2006, large companies and all listed companies have to apply International Financial Reporting Standards (IFRS). All other companies (small and medium) can apply International Financial Reporting Standards or they can apply new national accounting standards which are called Croatian Financial Reporting Standards (CFRS). The Board for Financial Reporting Standards was established by this Law on Accounting. This Board was accredited for development of CFRS.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Also, with the implementation of this Law on Accounting the Croatian Board for Accounting and Accounting Standards has ceased to exist. This accounting regulation was based on EU directives (Fourth and Seventh) and on IFRS, and it was aligned with the accounting regulation of other developed EU countries at that time.

New step in this phase can be determined with the implementation of Croatian Financial Reporting Standards (1 January, 2008). Also, on 1 January 2008 started the application of new Law on Accounting (2007). The CFRS are developed by the Board for Financial Reporting Standards and till today are developed 17 CFRS. The main criticism of CFRS was the fact that they have to be in accordance with IFRS which are too complicated for small and medium sized companies. In that Law on accounting were defined the groups of entrepreneurs, accounting procedures, the obligation for preparation of annual financial statements and consolidated financial statements as well as the obligation to prepare annual report for certain types of entrepreneurs. Furthermore, the obligation for public announcement of annual financial statements and consolidated financial statements has been prescribed in this Law on Accounting as well as the submission of statistical data to Financial agency.

Significant impact on changes in accounting regulation in Croatia has the Directive 2013/34/EU which main aim was to simplify the accounting regulation for micro entities. In accordance with this new Directive and new requirements, the accounting regulation in Croatia has been changed again, and the new Law on Accounting (2015) is applying from January 1, 2016. In this Law on Accounting are defined new classification of entrepreneurs (micro, small, medium and large) and groups of entrepreneurs, accounting organization, set of financial statements for certain types of entrepreneurs, the obligation for preparation of consolidated financial statements, preparation of annual report, public announcement and the responsibility for public announcement, the Registry of financial statements which is carrying on by Financial Agency as well as the oversight over the accounting affairs in entrepreneurs (Ministry of Finance).

Table 1. Main legal acts for regulation of accounting in Croatia, 1991-2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidated financial statements	Accounting methodology
1991	08.10. 1991	08.10. 1991	31.12. 1992.	Law on Accounting, 1991, Official Gazette, No. 53/91, 33/92.	X		X		X
1993	30.12. 1992.	01.01. 1993.	31.12. 2005.	Law on Accounting, 1992, Official Gazette, No. 90/92.	X	X	X	X	X
2006	12.12. 2005.	01.01. 2006.	31.12. 2007.	Law on Accounting, 2005, Official Gazette, No. 146/05.	X	X	X	X	X
2008	24.10. 2007.	01.01. 2008.	31.12. 2015.	Law on Accounting, 2007, Official Gazette, No. 109/07, 54/13.	X	X	X	X	X
2008	02.04. 2008.	10.04. 2008.	31.12. 2015.	Ordinance on the structure and content of annual financial statements, 2008, Official Gazette, No. 38/08, 12/09, 130/10.			X	X	
2016	17.07. 2015.	01.01. 2016.		Law on Accounting, 2015, Official Gazette, No. 78/15, 134/15, 120/16.	X	X	X	X	X

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidated financial statements	Accounting methodology
2016	20.10. 2016.	28.10. 2016.		Ordinance on the structure and content of annual financial statements, 2016, Official Gazette, No. 95/16.			X	X	

Source: Composed by authors according to references presented in the Table

During the observed period (1990-2017) significant changes has occurred in the public sector accounting. Intensive developing processes enclosed the transition from the application of cash basis to the application of accrual basis of accounting in the public sector accounting. The aim of reform processes was to harmonize regulatory framework in Croatia with international and European standards of financial and statistical reporting in order to include Croatia into European financial and economic processes (Hladika, 2013). First years after Croatia gained its independence the most important changes include the development of new institutional framework. First phase includes the period from 1991 to 1993, and the regulatory framework was taken from former Yugoslavia. In 1994, Croatia adopted its first Budget Law (1994). Accounting system in public sector according to this Budget Law was based on cash basis of accounting, the application of double-entry bookkeeping and unique chart of accounts for all public sector entities. Furthermore, by this Budget Law the state treasury was introduced and the classification systems were harmonized significantly with international standards of state financial statistics (GFS 1986). Next phase of development of public sector accounting started in 2002 when the cash basis of accounting in public sector accounting has been abandon and the modified accrual basis of accounting has been introduced. New Budget Law (2003) applied from June 1, 2003. This Budget Law regulated planning, the preparation of budget, management of assets and debts, management of public debt, budgetary relationships in public sector, accounting and financial reporting, and internal and budgetary oversight. International system of financial classification (GFS 2001) has been implemented in budgetary system by this Budget Law. Some changes were introduced in public sector accounting in following Budget Law (2008). European system of financial classification (ESA 2010) has been introduced by this Budget Law. Accounting organization, accounting principles and accounting methodology are defined in Ordinance for public sector accounting and chart of accounts (2014). The structure and content of financial statements of public sector entities are defined in Ordinance for financial reporting in public sector accounting (2015).

Till today, in Croatia are not developed national accounting standards for public sector entities but the suggestion is to apply International Public Sector Accounting Standards (IPSAS). Current state of development of public sector accounting indicates that in Croatia have to be undertaken many activities in order to introduce full accrual basis of accounting in the future.

4. Evolution of accounting regulation in the Czech Republic

Before we start dealing with the analysis of accounting regulation in the Czech Republic, it is necessary to put the development of the Czech Republic into historic context. The Czech Republic was a unified state together with the Slovak Republic until the end of 1992 (Czechoslovakia). Czechoslovakia was formed in 1918 and it underwent rather turbulent developments. After the Second World War, the communist party assumed power and it cast us in a totalitarian regime for more than 40 years. The economic system was corresponding: the Czechoslovak Socialist Republic (the official name back then) applied a central planned economy, which affected the relevant accounting regulation and the rules applied. Financial statements – if they were actually compiled –

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

had a totally different role than today. Companies presented expenses by nature, finished goods ("changes in inventories of finished goods" to be precise) were recognized as revenue. The legal framework for keeping the books was given by an act from 1971 – Act No. 21/1971 Coll., on Uniform System of Social-Economic Information.

"The Velvet Revolution", which refers to a period of political changes that resulted in the fall of communism and transition to democracy, took place in Czechoslovakia in 1989. It was linked with a change toward free-market economy. This was reflected in many legal industries, including accounting regulation. Technically speaking, the first (and immediate) action in the sphere of legal regulation of accounting was Decree No. 23/1990 Coll., on Accounting, issued by the Federal Ministry of Finance on the basis of the above stated act on Uniform System of Social-Economic Information of 1971 that came to force on 1 March 1990. This Decree defined that books were to be kept in two accounting systems: double-entry and single-entry systems. Nevertheless, the enactment of the Decree concerned accounting organization rather than definition of accounting principles and methods.

The actual reform of accounting regulation, which followed the reform of private law (Act No. 513/1991 Coll., the Commercial Code, entered in force as of 1 January 1992), occurred in 1991 when Act No. 563/1991 Coll., on Accounting (hereinafter referred to as the "Act on Accounting") was approved. The Act on Accounting, before any amendments, defined two accounting systems: the system of double entry bookkeeping and the system on the basis of cash receipts and disbursements (single-entry accounting system), and it also defined basic accounting principles, the duty to compile a single set of financial statements as well as the duty to compile consolidated financial statements, which was new at the time. It was a new legal regulation that has remained in force in the Czech Republic up to the present (even after the Czech Republic and the Slovak Republic split on 1 January 1993).

With respect to the fact that the Act on Accounting did not define (and doesn´t define even at present) specific accounting methods, arrangement of items in annual financial statements or other areas, it anticipated the approval of implementing regulations by the Ministry of Finance. Therefore, a series of decrees was issued and applied by the Federal Ministry of Finance, of which the most important one was Decree No. V/20 100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs. Its measures were substituted with new ones in the course of time – see the Table 2 below.

Quite a significant milestone in accounting regulation came in 2002 when the Act on Accounting was amended: this amendment defined more accurately defined accounting principles and it is referred to as the „Big Amendment" (Huleš, Jeřábek, 2001). Following this amendment, the Ministry of Finance of the Czech Republic issued a set of accounting regulations for different types of accounting units. These regulations were (in contrast with the previous ones) issued as subordinate legislation (implementing) statutory instrument and they entered in force in 2003. See their complete list in the Table 2 below.

The Ministry of Finance of the Czech Republic issued accounting standards describing accounting methods for different accounting units in more detail. These standards entered in force in 2004. Therefore, we may conclude by saying that there has been as three-level accounting regulation in the Czech Republic since 2004. The basic legal regulation is the Act on Accounting that defines, in particular, the scope of accounting units, accounting principles, accounting organization, requirements for a single set of financial statements and consolidated financial statements, requirements for auditing and principles of accounting methodology. The Ministry of Finance of the Czech Republic has also issued decrees for different types of accounting units that have the function of implementing legal regulation: they describe and define accounting methods in a greater detail and define how items in financial statements are to be arranged and marked. The third level consists in Czech

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

accounting standards (that are not considered a legal regulation) that are issued on the basis of authorization in the Act on Accounting and they describe accounting methods and processes in a greater detail.

Since 2004, the Act on Accounting has been amended rather greatly and it has brought along a lot of system changes. These included, in particular, cancellation of the legal regulation of single-entry accounting that could be maintained by certain natural persons (entrepreneurs) and smaller non-profit entities. A new system has been created for natural persons. It is similar to single-entry accounting, which is a system on the basis of cash receipts and disbursements. However, this system is not considered an accounting regulation, but it is regulated by the tax law and referred to as tax record keeping (this is, in fact, only for the purpose of defining the personal income tax base). Another intention of the change was to cancel the single-entry accounting system also for legal entities, with the view of all legal entities switching to double-entry accounting. This wasn´t accomplished, as deadlines for smaller non-profit entities were by which they were required to switch to double-entry accounting were postponed many times until 2016 when the Act on Accounting was amended by legal regulation stipulating the possibility of accounting in a single-entry system.

With respect to the fact that the Czech Republic has been a member of the European Union since 1 May 2004, the duty to use International Financial Reporting Standards in accordance with Resolution No. 1606/2002 of the European Parliament and of the Council of 19 July 2002, on the application of the International Financial Reporting Standards, was introduced as of that date. The Czech Republic has decided to introduce the duty to apply the IFRS also on the single set of financial statements, whereas there was first the duty to apply the IFRS to listed companies. As of 1 January 2011, the scope of subjects that may apply IFRS was extended and concerned also companies whose stocks are not traded on the regulated market and entities that are members of a group of companies that compile their consolidated financial statements according to the IFRS. Nevertheless, it should be pointed out that IFRS (obligatory as well as voluntary) cannot be applied for the purpose of determining the corporate income tax base. In other words, entities using the IFRS have to determine their income tax base from the profit according to Czech accounting regulations (like in case of entities that use Czech accounting regulations for financial statements – Skálová, 2017), which is subsequently adjusted by modifying certain items that significantly affect corporate income tax revenues in the Czech Republic (Mejzlík, Vítek, Roe, 2013). At present, there are discussions in the Czech Republic, whether the profit according to IFRS could be used as the income tax base in future (Procházka, 2013).

Another rather revolutionary change to Czech accounting regulations entered in force in 2010, when “reform in accounting of state administration” (state administration, state-funded organizations) was introduced. Health insurance houses and some other organizations introduced similar methodological rules that are applied by common business entities. The aim was to find out more accurate and relevant information about the financial position of those accounting units. The top priority was the possibility to compile a (consolidated) financial statements for the entire Czech Republic. A “consolidation decree” containing accounting methodology for consolidation was issued for this purpose in 2014.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Table 2. Main legal acts for regulation of accounting in the Czech Republic, 1990-2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidate d financial statements	Accounting methodology
1990	31.01. 1990	01.03. 1990	31.12. 1991	Decree of the Federal Ministry of Finance of the Czechoslovakia Republic No. 23/1990 Coll., on Accounting	X		X		
1991	12.12. 1991	01.01. 1992		Act No. 563/1991 Coll. on Accounting	X	X	X	X	X
1992	15.07. 1992	01.01. 1993	31.12. 2001	Decree No. V/20 100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs					X
1992	23.12. 1992	01.01. 1993	31.12. 2000	Decree No. V/1-31 370/1992 of 23 December 1992 laying down details of the accounting procedures for sole traders carrying out business activities or other activities generating income under the basis of cash receipts and disbursements			X		X
1992	29.12. 1992	01.01. 1993	31.12. 1995	Decree No. V/1- 31 388/1992 of 29 December 1992 laying down the structure and content of items of the balance sheet and the income statement for entrepreneurs			X		X
1995	21.12. 1995	01.01. 1996	31.12. 2001	Decree No. 281/71 701/95 of 21 December 1995 laying down the content of financial statements for entrepreneurs			X		X
2000	10.11. 2000	01.01. 2001	31.12. 2002	Decree No. 281, 283/77 411/2000 of 10 November 2000 laying down details of the accounting procedures for accounting units under the basis of cash receipts and disbursements			X		X
2001	14.11. 2001	01.01. 2002	31.12. 2002	Decree No. 281/89 759/2001 of 14 November 2001 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs					X
2001	14.12. 2001	01.01. 2002	31.12. 2002	Decree No. 281/97 417/2001 of 14 December 2001 laying down the content of financial statements for entrepreneurs			X		X
2002	06.11. 2002	01.01. 2003		Decree No. 500/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units that are entrepreneurs using the double-entry accounting system			X	X	X
2002	06.11. 2002	01.01. 2003		Decree No. 501/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units that are banks and other financial institutions			X	X	X
2002	06.11. 2002	01.01. 2003		Decree No. 502/2002 Coll. implementing some provisions of Act No . 563/1991 Coll., on Accounting, as amended, for accounting units that are insurance companies			X	X	X
2002	06.11. 2002	01.01. 2003		Decree No. 503/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for health insurance companies			X		X

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

2002	06.11. 2002	01.01. 2003		Decree No. 504/2002 Coll. implementing some provisions of Act No. 563/1991 Sb., on Accounting, as amended, for accounting units whose objects clause is not business, providing they use the double-entry accounting system			X		X
2002	06.11. 2002	01.01. 2003	31.12. 2005	Decree No. 506/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for the following accounting units: National Property Fund of the Czech Republic and National Land Fund of the Czech Republic			X		X
2002	06.11. 2002	01.01. 2003	31.12. 2003	Decree No. 507/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units using the single-entry system			X		X
2009	11.11. 2009	01.01. 2010		Decree No. 410/2009 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for selected accounting units (state administration)			X		X
2014	11.12. 2014	01.01. 2015		Decree No. 312/2014 Coll. on conditions for compiling accounting statements for the Czech Republic (the consolidation degree of the state)				X	X
2015	25.11. 2015	01.01. 2016		Decree No. 325/2015 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units using the single-entry accounting			X		X

Source: Composed by authors according to references presented in the Table

As the Table 2 presents, latest important amendment to Czech accounting regulations resulted from the duty to transpose Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, the purpose of which was to decrease administrative duties for micro and small accounting units (Žárová, 2013). Thus, a vast amendment to Czech accounting regulations reflecting these changes entered in force on 1 January 2016.

5. Evolution of accounting regulation in the Republic of Estonia

Half a century accounting in Estonia was part of the Soviet accounting system. The first step on the way to change the situation was made in 1990, while Estonia remained, albeit reluctantly, a constituent republic of the USSR. On July 6, 1990, the *Regulation of Accounting* (hereinafter the *Regulation*) was adopted by the National Government and came into force on January 1, 1991 (see Table 3). It is of special interest because it was the first measure adopted in any of the constituent republics of the USSR to mark a departure from the path of the Soviet accounting evolution. As pointed out by Bailey (Bailey et al., 1995), this event marked the beginning of the spread of accounting disharmony within the territories comprising the USSR. It was really an "accounting step" on the transition from command economy to market economy. The declared purpose of the *Regulation* was to bring about the organization of accounting in the conditions of a market economy. Real accounting continued to be perceived as properly subject to centralized prescription and its primary purpose the meeting of the needs of the central authorities of Estonia (Statistics Bureau, Tax Department) and not, as hitherto, those of the USSR (Alver J., Alver L., 2008).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

In 1991, the Estonian Accounting Board took the responsibility for the development of accounting in Estonia. The main tasks of the Board were declared to issue mandatory accounting guidelines and make recommendations concerning the methods which were to come into force. At that time the Board was independent governmental unit established by the government of Estonia and operating within the administrative jurisdiction of the Ministry of Finance. The *Regulation* was in force until 1995. This document introduced a number of new accounting concepts and principles, new terms and a new set of annual statements (included the balance sheet, the income statement and the statement of changes in the financial position and notes). The main characteristic of that period is that it was mixed from past (some elements of the former Soviet accounting system remained in force), present (real usage of new methods, principles and financial statements) and future (usage of many new terms of market economy which really were not represented in the Estonian economy). In accordance to the *Regulation* each enterprise was required to prepare a chart of accounts. In 1991 the accounting system was based on a chart of accounts published by the Ministry of Finance of the USSR. The former Soviet standard chart of accounts was officially used in Estonia until December 31, 1992. Since January 1, 1993 there is no standard chart of accounts in Estonia. Every company can introduce its own chart of accounts (Alver J., Alver L., 2008). Although, legally, the measure was a regulation and not statute (i.e. not approved by a legislative assembly but adopted by the executive action of the government) it was comparable to a fundamental, or basic, accounting law.

The second step started with the introduction of the first Estonian Accounting Act, which was passed by Parliament on June 8, 1994 and came into force on January 1, 1995. It was supported by introduction of the Estonian Commercial Code, which was passed by Parliament on February 15, 1995 and came into force on September 1, 1995. The Accounting Act did not contain a detailed set of rules and can best be characterized as constituting a legal framework. The legal framework was general and applied to all legal entities and physical persons registered as businesses in Estonia (referred to as accounting entities in the Act) with the exception of the Bank of Estonia (Alver *et al.*, 2001). It was declared to be based on internationally recognized accounting principles, which were established with the Accounting Act and *good accounting practice* (Estonian accounting guidelines, Estonian GAAP). The true and fair view override was declared. The Accounting Act was supplemented by a number of methodological recommendations (guidelines) on accounting matters issued by the Estonian Accounting Board. These recommendations related to such accounting areas as accounting principles, preparation of financial statements, revenue recognition, business combinations and others. All together there were 16 accounting guidelines, which set up conceptual framework of generally accepted accounting principles, revenue recognition, business combination, leases, government grants, earning per share, long-term construction contracts. The only problem was that these guidelines were not for obligatory use. They were only recommendations and in the case of contradictions with the Accounting Act, requirements of the Accounting Act had to be followed. The first Accounting Act was in force until 2002 and was changed several times. Unfortunately, these changes were mostly cosmetic. No attempt was made to enlist the support of accounting community for changes in accounting practices. There was no publication of drafts of the Accounting Act prior to their enactment. There has been no general discussion of the purpose or the proper understanding of the required accounting changes or the manner of their implementation.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Table 3. Main legal acts for regulation of accounting in the Republic of Estonia, 1990–2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel lation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidated financial statements	Accounting methodology
1990	06.07. 1990	01.01. 1991	31.12. 1994	The Regulation on Accounting	X	X	X		X
1994	08.06 1994	01.01. 1995	31.12 2002	The Accounting Act		X	X		X
2002	20.11 2002	01.01. 2003	31.12. 2015	The Accounting Act	X	X	X	X	
2015	10.12. 2015	01.01. 2016	31.12. 2016	Amendments for the Accounting Act	X	X	X	X	
2015	10.12. 2015	01.01. 2017		Amendments for the Accounting Act	X	X	X	X	X

Source: Composed by authors according to references presented in the Table

The third step started with the introduction of the new Estonian Accounting Act, which was passed by Parliament on November 20, 2002 and came into force on January 1, 2003. The new Accounting Act modified the status of the Estonian Accounting Board, which became an independent commission. The Accounting Act regulated basic accounting functions in all business entities registered in Estonia. The Accounting Act included separate chapter for consolidated accounts and for organization of public accounting. In December of 2003, the Minister of Finance approved the General Rules for Public Sector Accounting which came into force on the 1st of January 2004. A major change was that the public sector accounting rules were brought in line with the basic accounting principles of the IPSAS (International Public Sector Accounting Standards). The essence of the law is framed in compliance with IFRSs. The accounting policies and presentation formats used in accounting shall be in line with the requirements and basic principles provided for in this Act and with at least one of the following two accounting frameworks: Estonian GAAP and IFRSs. For companies it is optional to select the Estonian GAAP or IFRSs for annual and consolidated accounts. It is the company's free choice to choose between IFRSs or Estonian Accounting Guidelines but if IFRSs selected than there is no need to prepare a second set of accounts in accordance with local accounting guidelines. Large companies are expected to choose the full IFRSs option (from 2005 the translated text of international standards is also available). Listed companies and financial institutions are required to prepare their accounts in accordance with IFRS. SMEs are likely to use the revised Estonian GAAP as their accounting framework.

In 2013 the Estonian Accounting Board decided to switch from the Full IFRS to the IFRS for SMEs. Rightness of this decision is supported by the data, which testify that only about 0.2% of all annual reports were prepared in accordance with IFRSs (MFRE, 2015). Until 2013 the Estonian GAAP was based on the Full IFRS and included 17 guidelines, which had in total of about 400 pages. As the volume of the guidelines was considerably lower than that of the Full IFRS, some accounting areas were covered only very briefly or not at all. In areas, which were not covered by the regulations the IFRS treatment was recommended, but was not mandatory. Each guideline included a brief comparison with the respective IFRS/IAS standards. Nevertheless, there were no conceptual

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

differences between IFRSs and the guidelines. In some ways, the Estonian GAAP had less disclosure than IFRSs because it was allowed for SMEs. Therefore, large companies were expected to choose the Full IFRS option while other companies may use the set of the Estonian accounting guidelines as their accounting framework. Again, the guidelines had only status of recommendations. The main users of the Full IFRS are listed companies, banks, credit institutions, insurance companies, financial holding companies, mixed financial holding companies, investment firms and other large entities (Pacter, 2016). In Estonia about 99% of companies are micro, small, or medium size entities and on that reason it has been too complicate to use the Full IFRS as a basis for the Estonian GAAP. The guidelines of the Estonian Accounting Board focus on the accounting areas that are relevant in Estonia. Because of this, despite the reliance of the IFRS for SMEs, the guidelines do not cover all areas that are regulated by the IFRS for SMEs, but only those, which are relevant for a large number of entities in Estonia. In those areas in which the guidelines do not specify a particular accounting policy but which are regulated by the IFRS for SMEs, it is recommended to use as the basis the accounting policy described in the IFRS for SMEs. The guidelines of contain references to the specific paragraphs of the IFRS for SMEs. For example, the reference to 13.4 of the IFRS for SMEs refers to paragraph 4 of section 13 "Inventories" of the IFRS for SMEs.

The last changes in accounting legislation took place in 2015 due to the fact that the Member States of the EU were required by 20 July 2015 to bring into force the laws, regulations and administrative provisions necessary to comply with the Accounting Directive 2013/34/EU. In 2015 the Accounting Act was amended to be in line with the new Accounting Directive. The main changes were related to the introduction of differentiation of entities and changes of the requirements of the content of annual reports depending on the size of companies. In accordance with the classification of entities large-sized and medium-sized entities must present four main statements (balance sheet, income statement, cash flow statement and statement of changes in owners' equity) and notes. The annual reports of small-sized and micro-sized entities following the Estonian GAAP comprise at least two main statements (balance sheet and income statement) and notes. Micro-sized entities are allowed to prepare the abridged annual reports where only classified balance sheet including subcategories of accounts (for example, current assets, long-term assets, current liabilities and etc.) must be presented. From 2017 the Estonian GAAP was renamed to the Estonian financial reporting standard.

6. Evolution of accounting regulation in the Republic of Latvia

Noticeable changes in Latvian accounting were possible after adopting the constitutional law of the Republic of Latvia "On the State Status of the Republic of Latvia" dated 21 August 1991, when Latvian economics started its movement again from planned economies to free market. After the laws "On Accounting" and "On the Annual Reports of Undertakings" came into force on 1 January 1993, a rearrangement of Latvian accounting system was started. Latvian accounting system was arranged in a similar way to the accounting system of Denmark. (Millere I., 2005)

When drafting those laws, the basic provisions of the EU Directives were applied. Accounting rules are outlined most profoundly in the Fourth Directive; therefore, the law "On Accounting" of the Republic of Latvia (LR) was based on that Directive. (Brūna I., Millere I., Šneidere R., 2006)

At present, Latvian accounting is regulated by one basic law, "On Accounting" adopted in 1992 with further amendments applied to all who carry on business, however, business activity according to "Commercial Law" is any systematic self-dependent activity paid for. According to paragraph 15 of the law "On Accounting", Regulation No.585 "Regulation Regarding the Conduct and Organisation of Accounting" was passed by the Cabinet of Ministers in 2003, and they apply to subjects of the law "On Accounting" and establish basic requirements for accounting arrangements and organisation. Nevertheless, it should be noted that this is the third version of the Regulations by the Cabinet of Ministers substituting the regulations adopted in 1995 and 2000, thus

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

updating and clarifying the outdated requirements for organizing the accounting process as a whole as well as for specific issues, for example, composition of the document requisites when drafting electronic documents, etc. The law "On Accounting" also defines the criteria for keeping simple accounting records for farmers and fishermen farms, individual entrepreneurs, and individual contractors if the annual turnover does not exceed 300,000 EUR.

Except for those carrying on business activities and entitled to keep single entry accounting record system, all the others who have double entry accounting record system must submit annual reports according to the rules and requirements for filing provided in two fundamental laws "On the Annual Reports of Undertakings" and law "On the Consolidated Annual Reports" as well as other laws and legislative acts. The laws mentioned above do not apply to the members in financial and capital markets such as banks, insurance companies in the form of joint stock companies, private pension funds, etc. for whom the structure, scope, and content of annual reports as well as their preparation, auditing, and submitting procedure is regulated by laws for the activities of members in financial and capital markets such as "Law on Credit Unions", "Law on Financial Instrument Market", "Law on Insurance Agencies and Their Supervision" and other legislative acts adopted by the regulator, Financial and Capital Market Committee. The situation changed when pursuant to EU Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, a new law "On the Annual Financial Statements and Consolidated Financial Statements" was adopted in 2015 both by combining the two above mentioned laws and changing the existing rules for accounting record and content of financial statements significantly according to the requirements of the Directive.

Assessing the legal requirements of accounting record for the undertakers mentioned above of business activities, the conclusion is that laws and regulations contain the main accounting requirements and not detailed instructions for keeping accounting records. On the other hand, the elements for maintaining accounting records in state and local government agencies define the unified fundamental principle of bookkeeping and even the use of a chart of accounts in accounting. The requirements for maintaining accounting records in state and local government agencies are defined in the law "On Budget and Financial Management" adopted in 1994 and regulations on No.1486 "Procedure for Bookkeeping in Accounting Records in Budget Institutions" (15.12.2009). The preparation of annual reports in budget institutions is regulated by Regulations of the Cabinet of Ministers No.1115 "Procedure for Drafting Annual Report" (15.10.2013) which contain detailed procedure of preparing annual reports in public sector as well as the required forms and requirements for filling them up. The basic of the laws mentioned above regulating keeping accounting records and the applied accounting system in the Republic of Latvia have been summarised in Table 4.

Since legislative, regulatory acts in accounting do not give detailed solutions for many bookkeeping and evaluation issues just at the outset of accounting reforms there appeared a question about the application of International Accounting Standards (IAS) or working out Latvian Accounting Standards (LAS) as well as determining the subjects to whom their use is compulsory. The first attempt to work out and implement accounting standards failed. The law adopted on May 15, 2003 "On Accounting" had amendments stipulating the establishment of Accounting Council with the purpose to improve the quality of financial statements and compliance of legislative standards and regulations defining preparation of financial statements, with international accounting standards. (Millere I., 2005.)

Latvia made a decision to work out its own national accounting standards based on the traditional international accounting standards. Overall 11 Latvian accounting standards (LAS) have been adopted whose compulsory application was stipulated by Cabinet Regulation No. 201 "Regulations on Obligatory Applicable Latvian Accounting Standards" (27.03.2007) followed by amendments. Latvian accounting standards covered the most critical accounting areas: LAS 1 Guidelines for Drafting Financial Statement; LAS 2 Cash Flow Report; LAS 3

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Post Balance Sheet Events; LAS 4 Changes in Accounting Policy, Changes in Accounting Estimates and Historical Errors; LAS 5 Long-term Contracts; LAS 6 Revenue; LAS 7 Property, Plant and Equipment; LAS 8 Accruals, Contingent Liabilities and Contingent Assets; LAS 9 Investment Property; LAS 10 Lease; and LAS 11 Stocks. There was no essential difference between Latvian accounting standards concepts and International accounting standards (IAS).

Such a procedure was maintained in Latvia until 2011 when the Cabinet of Ministers ruled out the mandatory use of standards in accounting records of undertakings. Instead of the latter, the Cabinet of Ministers drafted and adopted Regulations No. 481 "Regulations on the Content and Procedure for Preparing the Cash Flow Report and Statement of Changes in Equity" and Cabinet Regulation No. 488 "Rules on the Application of the Law on Annual Accounts". There was an attempt to integrate the main rules from all pre-existing 11 accounting standards of Latvia, but their content was much more concentrated and created more problems for applying the requirements in practice. This Cabinet Regulation was in force until 2016, when Cabinet Regulation No. 775 "Regulations on the Application of the Law on Annual Accounts and Consolidated Annual Accounts" was approved two months after adopting the law "On Annual Report and Consolidated Annual Report" (22.12.2015), which together with the new Law were applicable to annual report for 2016. The most significant changes in the reduction of administrative burden by the Directive were the division of enterprises and groups from companies into four categories by setting composition and content of its annual report to each class and conditions for auditing. The changes also affected the presentation and assessment of several balance sheet items. The new order was assessed ambiguously as the amount of information to be included in the financial statements of micro and small companies was significantly reduced, although they account for 99% of the total number of enterprises in Latvia.

If the administrative burden is diminished, it influences the business environment positively, but on the other hand, there an unfavourable situation for the decision-makers about the volume, content, detailed level, and quality of available information might occur. If there would be only the minimum of the requirements set in Directive 2013/34/EU integrated into the national laws and rules for the regulation of accounting, the above-indicated consequences might be observed not only in Latvia but also in the EU Member States with a small economy. (Brūna, Millere, 2015)

Table 4. Main legal acts for regulation of accounting in the Republic of Latvia, 1992-2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel lation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidat ed financial statements	Accounting methodology
1992	12.11. 1992	01.01. 1993		The Law *On Accounting*	X	X	X		X
1992	12.11. 1992	01.01. 1993	01.01 2016	The Law *On Annual Reports of Undertakings*		X	X	X	X
19 94	24.03. 1994	26.04. 1994		The Law *On Budget and Financial Management*	X	X	X		X
1995	07.11. 1995	18.11. 1995	01.10. 2000	Regulations of the Cabinet of Ministers of Latvia No 339 *Regulation Regarding the Conduct and Organisation of Accounting of Enterprises*	X	X			

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel lation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidated financial statements	Accounting methodology
1999	30.09. 1999	01.01. 2000	22.11. 2006	The Law *On Consolidated Annual Accounts*				X	X
2003	21.10. 2003	30.10. 2003		Regulation of the Cabinet of Ministers of Latvia No 585 *Regulation Regarding the Conduct and Organisation of Accounting*	X	X			
2005	18.10. 2005	22.10. 2005	31.03. 2007	Regulation of the Cabinet of Ministers of Latvia No 201 *Regulations on Obligatory Applicable Latvian Accounting Standards*		X			X
2006	19.10. 2006	22.11. 2006	01.01. 2016	New edition of The Law *On Annual Reports of Undertakings* / new title – *Annual Accounts Law* New edition of the Law *On Consolidated Annual Reports*			X X	 X	X X
2011	21.06. 2011	01.07. 2011	01.01. 2016	Regulation of the Cabinet of Ministers of Latvia No 481 *Regulations on the Content and Procedure for Preparing the Cash Flow Report and Statement of Changes in Equity*			X		X
2011	21.06. 2011	01.07. 2011	01.01. 2016	Regulations of the Cabinet of Ministers of Latvia No 488 *Rules on the Application of the Law on Annual Reports*			X	X	X
2013	15.10. 2013	01.11. 2013		Regulations of the Cabinet of Ministers of Latvia No 1115 *Procedure for Drafting Annual Report*			X		X
2015	22.10. 2015	01.01. 2016		*The Law on the Annual Financial Statements and Consolidated Financial Statements*		X	X	X	X
2015	22.10. 2015	01.01. 2016		Regulations of the Cabinet of Ministers of Latvia No 775 *Application Rules of the Law on the Annual Financial Statements and Consolidated Financial Statements*		X	X	X	X

Source: Composed by authors according to references presented in the Table

In general, when analysing the development of Latvian accounting system at a time when it is significantly influenced by the processes of globalization, it should be concluded that after the restoration of Latvia's independence, it was repeatedly improved by adapting the legislation regulating accounting to the requirements of EU Directives and International Accounting Standards as much as possible. However, the nature of those changes indicates that until now, the Ministry of Finance of the Republic of Latvia does not follow a sound and sustainable accounting policy, although it is responsible for it. The fact that Latvia is both an EU Member State and a member of many other international organisations (International Monetary Fund, World Bank, World Trade Organization, OECD, etc.) has a positive impact on the development of accounting, as harmonization with the accounting systems of other countries is encouraged, but it also creates particular challenges such as selecting an appropriate accounting and valuation system, ensuring the quality of the annual reports and auditing, thus posing severe tasks for the future improvement of the Latvian accounting system.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

7. Evolution of accounting regulation in the Republic of Lithuania

Since 11 of March, 1990, when Lithuania regained its independence, the legal system of Lithuania has been reformed to meet the demands of the vast social and economic changes brought about by a return to democracy and a free market economic system. There has been a large scale of complicated changes faced by the national economy in the process of changeover from a state ownership to a private one. Many new private entities, especially medium and small-sized were established (Mackevičius, Zverovich, Kazlauskienė, 2011). Such situation required new legislation in all spheres as well as accounting. Although, till 1992, accounting used to be performed as a central planned economy accounting system based on detailed rules and instructions (Lakis, Subačienė, 2014), several important legislation on regulation of accounting were issued (see Table 5). The Resolution of the Government of the Republic of Lithuania „Due to the Taxation Rates of Amortization Deductions of Fixed Assets“ No. 368 (Lietuvos Respublikos, Vyriausybės nutarimas “Dėl pagrindinių…, 2017) was issued on 14 December, 1990 and was referred for all types and forms enterprises and organizations, irrespective of their ownership forms. The resolution stated, that all kinds of repairs had to be included into the sales' expenses of production (goods, works, services). It was also allowed to form a repair fund, if necessary. The resolution empowered Ministry of Economics, Ministry of Finance, Ministry of Industry and Department of Statistics to prepare and approve rules for the application of taxation rates of amortization deductions of fixed assets, which were widely used for calculation of depreciation and amortization not only for taxation purposes. Resolution of the Government of the Republic of Lithuania „Due to Organization of Accounting and Reporting“ No. 564 (Lietuvos Respublikos Vyriausybės nutarimas „Dėl buhalterinės..., 2017) was issued on 17 December, 1991. According to this resolution, companies had to organize accounting process in the way to provide timely and accurate information for state statistics, tax-calculating agencies, owners, creditors, business partners and to ensure legal framework for economic and commercial transactions (Lakis, Subačienė, 2014). The resolution enforced 5 international accounting standards for preparation of financial statements: IAS 1 Presentation of Financial Statements; IAS 2 Inventories; IAS 3 Consolidated Financial Statements (which was superseded in 1989 by IAS 27 and IAS 28), IAS 5 Information to Be Disclosed in Financial Statements, IAS 7 Statement of Cash Flows.

Although, during 1990 – 1992 period management of accounting methodology was appointed to the department of Accounting and reporting at the Department of Statistics and later for similar department at the Finance of Ministry of the Republic of Lithuania, but appointed functions were not implemented (Mackevičius, Subačienė, 2016a). So, during the accounting reformation from soviet accounting following the requirements of market economy many mistakes were made: no laws and other regulation documents on accounting were passed, an institution for accounting methodological management and supervision was not established, the concept for Lithuanian accounting restructuring and further development was not prepared, etc. (Mackevičius, Subačienė, 2016).

However, new level of accounting regulation started from 01 January, 1993, when the Law on the Principles of Accounting came into force (Lietuvos Respublikos Buhalterinės apskaitos pagrindų..., 2017). The Law obligated enterprises to organize their accounting procedures so that tax-accounting authorities, statisticians, creditors, and commercial partners could receive faithful and relevant information. It defined that accounting should be carried out in conformity with the provisions of International Accounting Standards and the European Union (formerly European Economic Community) Directives. This Law transferred accounting regulation from detail instructions to appliance of Generally Accepted Accounting Principles used in market economies, provided the procedure for the formalization and signing of documents confirming the execution of transactions, defined the composition and the procedure for the authorization of financial statements, the methods of assets valuation, stock-taking (Lakis, Subačienė, 2014).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

The Law on the Principles of Accounting was followed by several lower level legislation, which itemized some spheres of accounting. The Resolution of the Government of the Republic of Lithuania "Due to Annual Reporting of Legal Entities", No. 804 was issued 27 October, 1993 (Lietuvos Respublikos vyriausybės nutarimas "Dėl įmonių…, 2017). The Resolution provided order for preparation of financial statements, their forms and structure, types of the sets of financial statements. Additionally, it defined order for recognition and accounting of revenue and expenditures. At the lowest level accounting was regulated by the letters of the Ministry of Finance of the Republic of Lithuania. For the period from 1993 to 2000 there were issued: letter "On the Typical Forms of Annual Reporting and Explanation of the Most Important Items", No. 83N, 12 November, 1993; letter "On the Explanatory Note and the Chart of Ledger Accounts", No. 91N, 16 December, 1993; letter "On Quarterly Reporting", No. 24N, 22 March, 1994; letter "On Confirmation of Explanatory Note Forms", No. 75, 23 May, 1997; letter "On Addition of Recommended Chart of Ledger Accounts", No. 88, 10 June, 1997; letter "On Financial Accounting Order for Grants and Subsidies", No. 65, 16 March, 1999; letter "On Financial Accounting Order for Leased Assets", No. 144, 5 June, 2000 and others, which were frequently amended. Although the Law on the Principles of Accounting started new phase of accounting regulation, but more significant practical importance has The Resolution of the Government of the Republic of Lithuania "Due to Annual Reporting of Legal Entities", No. 804 and other letters issued by the Ministry of Finance of the Republic of Lithuania (Mackevičius, 2005).

Important role in the process of development of accounting regulation had establishment of the Institute of Audit and Accounting by letter of the Ministry of Finance of the Republic of Lithuania "Due to Establishment of the Institute of Audit and Accounting", No. 71, 29 June, 1995. On 21 December 1998 the Institute was renamed to the Institute of Audit, Accounting and Property Valuation of the Republic of Lithuania and subsequently in 2002 – to the Institute of Accounting (Mackevičius, Zverovich, Kazlauskienė, 2011).

Yet the approval of the Law on the Principles of Accounting and related legislation was a substantial step toward the reorganization of accounting in Lithuania. However, regulation of accounting in Lithuania was incoherent and unsystematic, different spheres of accounting were regulated by various legislation of different significance: laws, resolutions, orders, letters (Subaciene, Macerinskiene, Budrionyte, 2012). Before 2001 Lithuanian enterprises had used tax laws for carrying out accounting process. However, some larger enterprises applied international accounting standards (Lakis, Subačienė, 2014).

New phase of accounting regulation development started in 2001, when three significant laws were issued: the Law on Accounting (Lietuvos Respublikos Buhalterinės apskaitos…, 2017), the Law on Financial Statements (Lietuvos Respublikos Įmonių finansinės atskaitomybės…, 2017), and the Law on Consolidated Financial Statements (Lietuvos Respublikos Įmonių grupių..., 2017). The preparation process of the Law on Accounting lasted almost 3 years and has been started from 1998. During the process of preparation of the Law on Accounting, were prepared laws on Financial Statements and Consolidated Financial Statements (Mackevičius, 2005). Regardless of long laws' preparation process, it has to be highlighted, that these laws were complied with the Fourth (78/660/EEC) and Seventh (83/349/EEC) EU directives and started new phase of accounting regulation – integration to European accounting system (Бухгалтерский учет, 2007).

The Law on Accounting defines, that the general methodological management of accounting in accordance with the legislation of the Republic of Lithuania, in compliance with International Financial Reporting Standards and European Union law, is performed by the Ministry of Finance of the Republic of Lithuania. This Law regulates the arrangement of accounting. It also defines general requirements for the handling of accounting, the legalization and keeping of accounting documents and accounting registers, and the responsibility for the arrangement of accounting and safekeeping of documents. It specifies that legal entities have to apply provisions of the national accounting standards (Business Accounting Standards – in Lithuania), which regulate financial

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

accounting of non-listed companies. Legal entities, whose securities are traded on a regulated market, have to apply international financial reporting standards (Lakis, Subačienė, 2014). The Law on Financial Statements (Lietuvos Respublikos Įmonių finansinės atskaitomybės…, 2017) defines the general accounting principles, the general requirements for the preparation of financial statements, financial period, confirmation and publishing of financial statements, the composition and description of financial statements, their types, the evaluation of assets and liabilities, responsibility for financial statements' preparation and keeping. It states, that financial statements are prepared in accordance with the general accounting principles and the Business Accounting Standards, too. The Law on Consolidated Financial Statements (Lietuvos Respublikos Įmonių grupių..., 2017) specifies the terms and exceptions for the preparation of consolidated financial statements, composition and requirements for consolidated financial statements, requirements for consolidated financial statements' audit, confirmation and publishing. This law also refers, that consolidated financial statements are prepared according to the Law on Accounting, the Law on Financial Statements and Business Accounting Standards.

For regulation of different spheres and methodology of accounting were issued national accounting standards, which were called Business Accounting Standards. The adoption and revision of Business Accounting Standards was assigned to the Institute of Accounting (Lakis, Subačienė, 2014). On 18 December 2002, the Board of the Institute Of Accounting of the Republic of Lithuania approved first 17 Business Accounting Standards, which came into force from 01 January 2004 by the Law on Accounting. Since 2002 forty-two Business Accounting Standards have been developed. From September 2008 the Accounting Institute was renamed to the Audit and Accounting Authority (Mackevičius, Zverovich, Kazlauskienė, 2011) and from 2016 the Audit and Accounting Authority was reorganized into the Authority of Audit, Accounting, Property Valuation and Insolvency Management.

Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (Directive 2013/34/EU…, 2017) made a significant impact on changes of accounting regulation in Lithuania. The main aim of Directive to reduce the administrative burdens for micro enterprises, to prepare the framework for regulation of highest quality information, which should be prepared by enterprises. This Directive takes into account the Commission's better regulation programme, and, in particular, the Commission Communication entitled "Smart Regulation in the European Union", which aims at designing and delivering regulation of the highest quality whilst respecting the principles of subsidiarity and proportionality and ensuring that the administrative burdens are proportionate to the benefits they bring. The main provisions were transferred into Lithuanian legislation. The Law on Accounting, the Law on Financial Statements, the Law on Consolidated Financial Statements, Business Accounting Standards and other legislation were amended in 2015. Amendments came into effect since 2016 (Mackevičius, Subačienė, 2016). However, all types of legislation including laws (the Law on Accounting was amended 31 times; the Law on Financial Statements – 14 times; the Law on Consolidated Financial Statements – 12 times), resolutions, accounting standards (Business Accounting Standards were amended from 2 to 14 times) were amended since their issue, but amendments proceeded in 2015 were significant and made the biggest impact in arrangement of accounting for micro-enterprises. Moreover micro-enterprises makes around 80 % of total number of enterprises in Lithuania (Mackevičius, Subačienė, 2016a). 2016 maybe distinguished as new evolution of accounting regulation phase.

Additionally has to be mentioned evolution of public sector accounting. Before 2005, public sectors subjects arranged accounting process under public delegated functions by modified monetary principle, monetary or accrual based principle. All transactions were recorded by received appropriations (inflows) and their usage (outflows). Under the Law on Accounting they had to apply standards for budget institutions, which were not issued yet. So, public sector subjects applied different types of legislation (Bikiene, 2011).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Public sector accounting reform in Lithuania was conducted in accordance with the plan of modernization of financial management in the European Union and was initiated by the Resolution of the Government of the Republic of Lithuania "Due to the Conceptual Framework of the Public Sector Accounting and Financial Reporting System Reform and the Formation of a Commission for the Coordination and Monitoring of the Reform", which were issued on 29 June, 2005 (Lietuvos Respublikos Vyriausybės nutarimas "Dėl viešojo sektoriaus…, 2017). The first step in this direction was the application of accrual based accounting principle. According to the plan of the European Commission, in January 2005, a new accounting system came into effect and new rules for accounting, based on International Public Sector Accounting Standards (IPSAS) were set. (Lakis, Subačienė, 2014). On 26 June, 2007 the Law on Public Sector Financial Statements in the Republic of Lithuania was passed and came into force from 01 January 2008. The Law (Lietuvos Respublikos Viešojo…, 2017) defines generally accepted accounting principles, composition of public sector financial statements, general, official registration's and additional requirements for public sector financial statements, requirements for consolidated financial statements, evaluation of assets, funding and liabilities, responsibility for preparation, signing, publication and keeping of public sector financial statements. Until the end of 2008 twenty six Public Sector Accounting Standards, general chart of ledger accounts for public sector, manuals for different public sector institutions, consolidation manual, recommendations for different groups of public sector subjects were prepared and confirmed, amended related legislation (Mackevičius, Subačienė, 2016a). Since public sector accounting reform twenty-eight Public Sector Accounting Standards have been developed.

Table 5. Main legal acts for regulation of accounting in the Republic of Lithuania, 1990-2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidate d financial statements	Accounting methodology
1990	14.12. 1990	14.12. 1990	01.04. 1994	Resolution of Government of Republic of Lithuania „Due to the Taxation Rates of Amortization Deductions of Fixed Assets" No. 368					X
1991	17.12. 1991	17.12. 1991	11.02. 2005	Resolution of Government of Republic of Lithuania „Due to Organization of Accounting and Reporting" No. 564	X		X	X	X
1992	18.06. 1992	01.01. 1993	01.01. 2002	The Law on the Principles of Accounting No. I-2654	X	X	X		X
1993	27.10. 1993	01.01. 1994	11.02. 2005	Resolution of the Government of the Republic of Lithuania "Due to Annual Reporting of Legal Entities" No. 804			X		X
2001	06.11. 2001	01.01. 2002		The Law on Accounting No. IX-574	X				X
2001	06.11. 2001	01.01. 2003		The Law on Financial Statements No. IX-575		X	X		
2001	06.11. 2001	01.01. 2004		The Law on Consolidated Financial Statements No. IX-576				X	
2004	End of 2003	01.01. 2004		Business Accounting Standards					X

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidate d financial statements	Accounting methodology
2005	29.06. 2005	01.07. 2005		Resolution of the Government of the Republic of Lithuania "Due to the Conceptual Framework of the Public Sector Accounting and Financial Reporting System Reform and the Formation of a Commission for the Coordination and Monitoring of the Reform" No.718	X				
2007	26.06. 2007	01.01. 2008		The Law on Public Sector Financial Statements in the Republic of Lithuania		X	X	X	
2008	2007-2008	01.01. 2008		Public Sector Accounting Standards					X
2015	2015	01.01. 2016		Amendments for the Law on Accounting	X				
2015	14.05. 2015	01.01. 2016		New edition of The Law on Financial Statements No. XII-1696			X		
2015	14.05. 2015	01.01. 2016		New edition of The Law on Consolidated Financial Statements No. XII-1697				X	

Source: Composed by authors according to references presented in the Table

After the accounting reform in public sector, accounting in the Republic of Lithuania is regulated at the three levels. First level includes the Law on Accounting, second level is based on laws which regulate requirements for the information provided in the financial statements and preparation of financial statements (the Law on Financial Statements and the Law on Consolidated Financial Statements for private sector; the Law on Public Sector Financial Statements for public sector), the third accounting regulation level includes Business Accounting Standards or International Financial Reporting Standards for private sector and Public Sector Accounting and Financial Reporting Standards, accordingly (Lakis, Subačienė, 2014).

8. Evolution of accounting regulation in the Slovak Republic

In March 29, 1990 the Czechoslovak Socialistic Republic renamed to the Czech-Slovak Federative Republic (since April 23, 1990 - Czech and Slovak Federative Republic) with Slovakia as a part of it. Slovakia had the same cultural, political, legislative and social background as the Czech Republic until the end of 1992. The changes in these areas were first connected with the Velvet Revolution in 1989 and then following with the peaceful partition of the Czech and Slovak Federative Republic (CSFR) in 1993. The development in accounting legislation had assimilated to the changed conditions in the political and economic situation. Until December 1991 the integrated system of social-economic information was implemented and applied as in the central planned economy. The period between 1989 and 1991 was a kind of transitional period of gradual and progressive change in accounting system. In this period new legislation was issued with the force from January 1, 1990 and effectiveness only until December 31, 1991. There were issued: the Act No. 128/1989 Coll. which amended the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

most important act in the central planned economy – Act No. 21/1971 Coll. on integrated system of social-economic information; the regulation of CSFR´s government No. 136/1989 on information system of organisations and several ordinances connected with charts of accounts and accounting (Šlosár, 2008) and later on Federal Ministry of Finance adopted Decree No. 23/1990 Coll., on Accounting, that came to force on 1 March 1990.

The transformation from the central planned economy to free market economy system with the private not only state ownership and need of national and international accounting information comparison requested radical reform of accounting system. One of the initial stages of this reform was the enactment of the obligation for accounting entities to maintain their accounts in the Commercial Code No. 513/1991 of 5 November 1991 and effective since January 1, 1992. The result of this reform was the first act on accounting in modern history - Act No. 563/1991 Coll. on Accounting approved by the CSFR´s federal assembly on December 12, 1991 and effective from January 1, 1992. This act introduced more comprehensive accounting information system with a new methodology in the system on the basis of cash receipts and disbursements and in the system of double entry bookkeeping and it also introduced for the first time rules for the consolidated financial statements. In accord with the Act No. 563/1991 Coll. on Accounting several decrees were issued and applied by the Federal Ministry of Finance e.g. Decree No. V/20100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs (see Table 6). Other types of accounting entities (e.g. banks, insurance companies) were regulated by separate decrees laying down their frameworks for the chart of accounts, details of the accounting procedures and financial statements.

The Slovak Republic has achieved its independence since January 1, 1993. The Commercial Code No. 513/1991, Act No. 563/1991 Coll. on Accounting, Decree No. V/20100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs, sole traders and decrees for other types of accounting entities (e.g. municipalities, non-profit organizations, political parties, civic associations, banks, health insurance companies, insurance companies) have been kept and later several times amended by the Ministry of Finance of the Slovak Republic. Except for decrees for accounting procedures there were also single decrees for financial statements for entrepreneurs (Table 6) and for other types of accounting entities. The rules for consolidated financial statements were provided undetailed in two paragraphs (§22 and 23) of the Act No. 563/1991 Coll. on Accounting as amended. That is why the Ministry of Finance of the Slovak Republic issued Decree No. 65/393/1993 of 22 December 1993 on the preparation of the consolidated financial statements. The Slovak Republic had had an intention to become part of the European integration since its early establishment that is why the Ministry of Finance incorporated the rules of the Seventh EU directive (83/349/EEC) and International Accounting Standards. First consolidated financial statements ever were prepared as of 31 December 1993 in accordance with the topical accounting legislation valid in the Slovak Republic at that time. In 1994 the Ministry of Finance of the Slovak Republic issued two analogical degrees (Table 6) on the preparation of the consolidated financial statements of banks and consolidated financial statements of insurance companies (Farkaš, 2013).

A significant change came with the access negotiations of the Slovak Republic to the European Union. The Slovak legislation needed to be fully harmonized with the regulations of the European Union before its official membership since May 1, 2004. The Ministry of Finance of the Slovak Republic had developed and issued a new act on accounting, Act No. 431/2002 Coll. on Accounting which came into force on January 1, 2003 (there was an exception for "financial year", this paragraph came into force one year later). The Act No. 431/2002 Coll. on Accounting as amended (hereafter: Act on Accounting) has the primacy in the Slovak accounting legislation and cancelled the previous Act No. 563/1991 Coll. on Accounting including all decrees which were published in accordance with the previous act. It is a general act for all types of accounting entities without setting specifics for individual types of accounting entities (Šlosár, 2008). The obligation for entrepreneurs to maintain their accounts

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

is stated in the Commercial Code No. 513/1991 as amended (Chapter IV, Articles 35-40). This obligation is connected with the fact that every type of business uses accounting and the types of business, including their features, are also defined in the Commercial Code. (Hladika, Mokošová, Molín, 2017). The new Act on Accounting was complied with the Fourth EU directive (78/660/EEC), the Seventh EU directive (83/349/EEC), the Eight EU directive (84/253/EEC), other EU directives which set additional requirements in specific issues (e.g. individual and consolidated financial statements of banks or insurance companies) and with the some definitions and concepts of International Accounting Standards. In connection with the new Act on Accounting several decrees were issued. They contained the rules for maintaining accounts in double entry bookkeeping by different types of accounting entities, frameworks chart of accounts and financial statements and one degree for the basis of cash receipts and disbursements. Since 2003 were in force: Decree of the Ministry of Finance of the Slovak Republic No. 23 054/2002-92 of 16 December 2002, laying down details of the accounting procedures and the framework for the chart of accounts for entrepreneurs maintaining accounts under the system of double entry bookkeeping (hereafter: Decree of the MFSR on double entry bookkeeping for entrepreneurs); Decree of the Ministry of Finance of the Slovak Republic No. 4455/2003-92 of 31 March 2003, laying down details of the structure, description and content of items of financial statements for an individual entity and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the system of double entry bookkeeping; Decree of the Ministry of Finance of the Slovak Republic No. 23586/2002-92 of 17 December 2002, laying down details of the accounting procedures and details of the structure, description and content of items of financial statements and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the basis of cash receipts and disbursements, doing business or undertaking other independent earning activities where they report expenses incurred for acquiring, assuring and maintaining income in order to determine their income tax (hereafter: Decree of the MFSR on single entry bookkeeping for entrepreneurs). In 2002 – 2003 new decrees on accounting procedures, framework for the chart of accounts and financial statements for other types of accounting entities (e.g. the Slovak National Bank, health insurance companies, state funds) were issued by the Ministry of Finance of the Slovak Republic.

In connection with the new Act on Accounting next three decrees on the preparation of consolidated financial statements (separately for entrepreneurs, banks and insurance companies) were issued by the Ministry of Finance of the Slovak Republic. These three decrees had been effective only for two years 2003-2004, because the Slovak Republic implemented Regulation (EC) No. 1606/2002 of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards and in this respect amended the Act on Accounting (Parišová, 2010). This amendment caused the repeal not only above mentioned three decrees on consolidated financial statements, but also decrees on maintaining accounts and framework charts of accounts for banks, insurance companies and large companies. The Slovak Republic had enforced the Article 4 and 5 of Regulation (EC) No. 1606/2002 and applied the IFRS as adopted by the EU for preparation of all consolidated financial statements (with the exception of consolidated financial statements of public administration accounting entities) since 2005 and individual financial statements of banks, insurance companies and large companies since 2006. The obligation to prepare the consolidated financial statements remains in the amended Act on Accounting and if accounting entities meets the requirements, then they have to prepare the consolidated financial statements in accordance with IFRS as adopted by the EU (Farkaš, 2013).

The guiding principle "think small first" implemented by the European Commission in its last accounting directive (Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings as amended) in order to further simplify the requirements for SMEs has significantly impacted the Slovak accounting regulation. First of all the Act on Accounting was amended and the size criteria for classification of entrepreneurs were harmonized with the Directive 2013/34/EU. Accounting entities are classified into micro, small, large accounting entities and public interest entities in accordance with the Act on Accounting (Article 2

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

(5) to (12)) which amendment came into force on January 1, 2015. This amendment of Act on Accounting caused the repeal of the Decree of the Ministry of Finance of the Slovak Republic No. 4455/2003-92 laying down details of the structure, description and content of items of financial statements for an individual entity and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the system of double entry bookkeeping and the implementation of two new decrees: Decree of the Ministry of Finance of the Slovak Republic No. MF/23377/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for large accounting entities and public interest entities, as amended and Decree of the Ministry of Finance of the Slovak Republic No. MF/23378/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for small accounting entities, as amended with the effectiveness of amendments on January 1, 2016. Both of these new decrees have been amended once since their force on January 1, 2015. The decree for micro accounting entities was issued one year earlier as Decree of the Ministry of Finance of the Slovak Republic No. MF/15464/2013-74 of 11 December 2013 laying down details of the structure, description and content of items of individual financial statements for micro accounting entities, as amended (amended once since January 1, 2014). The amendments of Act on Accounting, Decree of the MFSR on double entry bookkeeping for entrepreneurs and new decrees for financial statements applied certain simplifications of accounting procedures and preparation of financial statements for micro and small accounting entities.

Topical version of the Act on Accounting consists of nine parts and except for the accounting systems it also defines other principal accounting issues such as accounting documents, accounting entries, accounting books, framework for the chart of accounts and accounting entity´s chart of accounts, financial statements, audit of financial statements by an auditor, annual report, consolidated financial statements, register, valuation methods, reconciliation procedures, accounting documentation (Hladika, Mokošová, Molín, 2017). Since 2002 the Act on Accounting has been amended 25 times and Decree of the MFSR on double entry bookkeeping for entrepreneurs has been amended 14 times. Decree of the MFSR on single entry bookkeeping for entrepreneurs (new decree from 2007) has been amended 8 times.

Table 6. Main legal accounting regulation for entrepreneurs in the Slovak Republic, 1993-2017

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidat ed financial statements	Accounting methodology
1993	12.12. 1991	01.01. 1992	31.12. 2002	Act No. 563/1991 Coll. on Accounting	X	X	X	X	X
1993	15.07. 1992	01.01. 1993	31.12. 1998	Decree No. V/20100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs					X
1993	23.12. 1992	01.01. 1993	07.09. 1994	Decree No. V/1-31 370/1992 of 23 December 1992 laying down details of the accounting procedures for sole traders carrying out business activities or other activities generating income under the basis of cash receipts and disbursements			X		X
1993	29.12. 1992	01.01. 1993	09.04. 2003	Decree No. V/1- 31 388/1992 of 29 December 1992 laying down the structure and content of items of the balance sheet and the income statement for entrepreneurs			X		X
1993	15.11. 1993	30.11. 1993	09.04. 2003	Decree No. 65/277/1993 of 15 November 1993 laying down the content of the notes forming part of financial statements of entrepreneurs			X		X

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Year	Legislation				Accounting regulation spheres				
							Reporting		
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Single set of financial statements	Consolidat ed financial statements	Accounting methodology
1993	22.12. 1993	25.01. 1994	30.11. 2003	Decree No. 65/393/1993 of 22 December 1993 on the preparation of the consolidated financial statements				X	X
1994	19.08. 1994	08.09. 1994	31.12. 2008	Decree No. 65/396/1994 of 19 August 1994 laying down details of the accounting procedures for sole traders maintaining accounts under the basis of cash receipts and disbursements, doing business or undertaking other independent earning activities where they report expenses incurred for acquiring, assuring and maintaining income in order to determine their income tax			X		X
1994	23.05. 1994	18.08. 1994	31.07. 2003	Decree No. 65/253/1994 of 23 May 1994 on the preparation of the consolidated financial statements of insurance companies				X	X
1994	23.05. 1994	18.08. 1994	31.05. 2003	Decree No. 65/252/1994 of 23 May 1994 on the preparation of the consolidated financial statements of banks				X	X
1998	16.11. 1998	01.01. 1999	31.12. 2002	Decree No. 3177/1998-KM of 16 November 1998 regulating the chart of accounts and accounting procedures for entrepreneurs					X
2002	18.06. 2002	01.01. 2003		Act No. 431/2002 Coll. on Accounting	X	X	X	X	X
2002	16.12. 2002	01.01. 2003		Decree No. 23 054/2002-92 of 16 December 2002, laying down details of the accounting procedures and the framework for the chart of accounts for entrepreneurs maintaining accounts under the system of double entry bookkeeping					X
2002	17.12. 2002	01.01. 2003	31.12. 2007	Decree No. 23586/2002-92 of 17 December 2002, laying down details of the accounting procedures and details of the structure, description and content of items of financial statements and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the basis of cash receipts and disbursements, doing business or undertaking other independent earning activities where they report expenses incurred for acquiring, assuring and maintaining income in order to determine their income tax			X		X
2003	31.03. 2003	10.04. 2003	31.12. 2014	Decree No. 4455/2003-92 of 31 March 2003, laying down details of the structure, description and content of items of financial statements for an individual entity and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the system of double entry bookkeeping			X		X
2003	11.11. 2003	01.12. 2003	31.12. 2004	Decree No.16680/2003-92 of 11 November 2003 laying down details of the methods and accounting procedures of consolidation and consolidated financial statements				X	X
2007	13.12. 2007	01.01. 2008		Decree No. MF/27076/2007-74 of 13 December 2007, laying down details of the accounting procedures and details of the structure, description and content of items of financial statements and the extent of data contained in these financial statements to be published by entrepreneurs maintaining accounts under the basis of a cash receipts and disbursements, doing business or undertaking other independent earning activities where they report expenses incurred for acquiring, assuring and maintaining income in order to determine their income tax			X		X

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Year	Legislation				Accounting regulation spheres				
	issue date	effect date	cancel ation date	type and title	Accounting organization	Accounting principles	Reporting: Single set of financial statements	Reporting: Consolidated financial statements	Accounting methodology
2013	11.12. 2013	01.01. 2014		Decree No. MF/15464/2013-74 of 11 December 2013 laying down details of the structure, description and content of items of individual financial statements for micro accounting entities			X		X
2014	03.12. 2014	01.01. 2015		Decree No. MF/23377/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for large accounting entities and public interest entities			X		X
2014	03.12. 2014	01.01. 2015		Decree No. MF/23378/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for small accounting entities			X		X

Source: Composed by authors according to references presented in the Table

In the meanwhile, the Ministry of Finance of the Slovak Republic accepted a proposal of two acts amending the Act on Accounting with effectiveness as of 1 January 2018. These two acts amend a delivery of documents to the tax authority or the electronic mailroom and the valuation of assets and liabilities by the European company, European cooperative or European economic interest group. One of the changes is connected with the more effective control of the observance of accounting legislation; the preservation of the accounting documentation will be prolonged from 5 years to 10 years. Besides it should be implemented the status of administrative offence having been committed repeatedly including the sanction for it. These proposals should assign some objectives of the Governmental Action Plan against Tax Fraud 2012-2016 (Mokošová, Subačienė, Hladika, Molín, 2017).

At the present time except for the accounting legislation for entrepreneurs there are valid accounting decrees connected with Act on Accounting for banks; budgetary organizations, subsidized organizations, municipalities, state funds and institutions that are financed from the state budget; non-entrepreneurs (i.e. non-profit organizations, political parties, civic associations and other similar bodies); health insurance companies; the Social Insurance Company; the Export-Import Bank of the Slovak Republic; security traders; mutual funds, pension funds and supplementary pension funds and Deposit Guarantee Fund, Guarantee Fund for Investment and electronic money institutions. Accounting regulation in the public sector consists from several decrees which amendments were partially influenced by IPSASs (Kordošová, 2008).

9. Research findings

Comparison of research results is presented in the Appendix 1 and generalized accounting evolution division on phases - in Figure 2.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

The Republic of Croatia	1	1	1	2	2	2	2	2	2	3	3	3	3	4	4
The Czech Republic	1	1	2	2	2	2	3	3	3	3	3	3	3	4	4
The Republic of Estonia	1	1	1	1	2	2	2	2	2	2	2	3	3	4	4
The Republic of Latvia	1	1	1	2	2	2	2	2	2	2	3	3	3	4	4
Year	90	91	92	93	1994 - 2001	02	03	04	05	06	2007 - 2013	14	15	16	17
The Republic of Lithuania	1	1	1	2	2	3	3	3	3	3	3	3	3	4	4
The Slovak Republic	1	1	2	2	2	2	3	3	3	3	3	4	4	4	4

Fig. 2. Accounting regulation evolution division on phases

Source: Composed by authors

Research results show, that accounting regulation evolution phases are related with issue or amendments of Law (or Act) on Accounting and evolution of accounting regulation in analysed countries may be distinguished in four general phases. The period of evolution started at the beginning of nineties (1990–1993) when the countries transformed from a central planned economy to market economy, accounting performed as a central planned economy. Accounting system was reformed and substituted by completely new accounting regulation. Common factors influencing the development of the first phase are gaining the independence, transition from a central planned economy to market economy, social and economic changes, and emergence of new entrepreneurial entities. Common factors, which made impact for development of second phase (1992 – 2007), when laws on accounting and additional legislation were issued and accounting regulating laws were aligned with Fourth and Seventh EU Directives, are such as need for approving a comprehensive regulation of accounting, creation of an accounting system accessing the EU, stronger impact of globalization, beginning of the development of national accounting standards. Third phase (2003–2015) was devoted for further improvement of financial statement structure, implementation of IFRS and national accounting standards and were influenced by such common factors as necessity of improvement of influence of an economic crisis, issue of the new laws regulating accounting, the new setting of the application of a national accounting standards. Fourth phase (2012–present) express a significant influence on accounting regulatory acts of requirements of Directive 2013/34/EU of the European Parliament and Council and was influenced by factors of implementation of requirements of Directive 2013/34/EU into national Laws regarding accounting and diversification of composition and content of financial reports for different categories of companies.

Differences of analysed countries may be distinguished by several aspects (see Figure 3). Accounting system is regulated by one law in Croatia (Law on Accounting), The Czech Republic, The Slovak Republic, The Republic of Estonia (Accounting Act), but it is supplemented by many ordinances and decrees regarding accounting procedures, content and structure of financial statements, and by several laws in Latvia (Law on Accounting, Law on the Annual Financial Statements and Consolidated Financial Statements), in Lithuania (Law on Accounting; Law on Financial Statements; Law on Consolidated Financial Statements). The basic legal acts define the scope of accounting units, accounting principles, accounting organization, requirements for a single set of financial statements and consolidated financial statements, requirements for auditing and principles of accounting methodology. Significant problems (incoherent and unsystematic regulation of an accounting,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

different areas regulation by various legislation, does not exist sustainable accounting policy) caused many amendments of legal acts in all countries.

	LA/AA	FCA	IFRS	NAS	IAAS	PSR	PSIAS	PSNAS
1990								
1991	CZ, EE, SK		LT		EE			
1992		CZ, SK						
1993	HR, LV, LT		HR, LV		HR			
1994		LT						
1995					LT			
…								
2002						HR		
2003			EE	EE				
2004			CZ	CZ, LT				
2005			SK			LT		
2006								LT
2007				LV				
2008				HR		SK		
2009								
2010						CZ		
…								
2017								

Fig. 3. Chronological map of accounting regulation evolution main elements

Abbreviations:
LA/AA – Law on Accounting/ Act on Accounting; FCA – Framework of Chart of Accounts; IFRS – International Financial Reporting standards; NAS – National Accounting Standards; IAAS – Organization for Accounting and/or Accounting Standards; PSR – Public Sector Reform; PSNAS – Public Sector National Accounting Standards; PSIAS – Public Sector International Accounting Standards.

Source: Composed by authors

Application of the IFRS is a common feature in the countries under study because they all are the member states of the EU, however in Croatia and Estonia there is a possibility to apply IFRS or local Financial Reporting Standards for micro, small and medium companies as well. It was concluded that national accounting standards were introduced in Croatia, Czech Republic, Lithuania and Latvia, however in Latvia the Cabinet of Ministers ruled out the mandatory use of standards in accounting records of undertakings from 2011.

Although Croatia entered the European Union only in 2013, its accounting system's development stages, regulatory measures and requirements are similar to other countries involved in the study, so the hypothesis that newly formed, independent European countries accounting development depends on accession to the European Union should be rejected.

Reform of public sector accounting was performed in The Republic of Croatia, The Republic of Lithuania, and the Slovak Republic, when the cash basis of accounting in public sector accounting transferred to accrual basis of accounting or modified accrual basis of accounting (the Republic of Croatia). In the Czech Republic before 2010 public sector entities kept accrual based accounting (not cash based accounting) but with limited methods.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

National public sector accounting and financial reporting standards were issued only in Lithuania. In the Slovak Republic public sector accounting regulation consists from several decrees which amendments were partially influenced by IPSASs.

References

Act No. 21/1971 Coll., on Uniform System of Social-Economic Information

Act No. 431/2002 Coll. on Accounting as amended

Act No. 563/1991 Coll. on Accounting

Alver, J., Alver, L. 2008. Development of Accounting and Implementation of international Financial Reporting Standards in Estonia, in McGee, R. W. (Ed.) *Accounting Reform in Transition and Developing Economies*. New York: Springer, 101–113.

Alver, J., Alver, L., Mackevicius, J., Paupa, V., Bailey, D. 2001. Baltic States. In Alexander, D; Acher, S (Eds) *European Accounting Guide*, New York: Harcourt Brace Professional Publishing, 1481–1504.

Bikiene, J. 2011. Viešojo sektoriaus apskaitos ir finansinės atskaitomybės standartų įgyvendinimo praktikoje problematika [Problems of Public Sector Accounting and Financial Reporting Standards Implementation into Practice] Verslas: teorija ir praktika [Business: Theory and Practice], No. 2011 12(2): 131-140. DOI: 10.3846/btp.2011.14. Available on the Internet: http://etalpykla.lituanistikadb.lt/fedora/objects/LT-LDB-0001:J.04~2011~1367181609757/datastreams/DS.002.0.01.ARTIC/content.

Brūna I., Millere I. The impact of the new Accounting Directive (2013/34/EU) on the normative Regulations of the Republic of Latvia. International scientific conference "New challenges of economic and business development-2014", 8-10 May, 2014, Riga : Conference proceedings / organised by Faculty of Economics and Management, University of Latvia in cooperation with Latvian European Community Studies Association ... [u.c.]. Riga: University of Latvia, 2014 P.52-64: tab. , URL: https://dspace.lu.lv/dspace/handle/7/5410 ISBN 9789984458366.

Brūna I., Millere I., Šneidere R. Accounting Policy and Developmental Issue in Latvia. Rachunkowość W Zarządzaniu Jednostkami Gospodarczymi. Szczecin, 2006, 37. – 43.p.

Decree No. 281, 283/77 411/2000 of 10 November 2000 laying down details of the accounting procedures for accounting units under the basis of cash receipts and disbursements.

Decree No. 281/71 701/95 of 21 December 1995 laying down the content of financial statements for entrepreneurs.

Decree No. 281/89 759/2001 of 14 November 2001 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs.

Decree No. 281/97 417/2001 of 14 December 2001 laying down the content of financial statements for entrepreneurs.

Decree No. 312/2014 Coll. on conditions for compiling accounting statements for the Czech Republic (the consolidation degree of the state).

Decree No. 325/2015 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units using the single-entry accounting.

Decree No. 410/2009 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for selected accounting units (state administration).

Decree No. 500/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units that are entrepreneurs using the double-entry accounting system.

Decree No. 501/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units that are banks and other financial institutions.

Decree No. 502/2002 Coll. implementing some provisions of Act No .563/1991 Coll., on Accounting, as amended, for accounting units that are insurance companies.

Decree No. 503/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for health insurance companies.

Decree No. 504/2002 Coll. implementing some provisions of Act No. 563/1991 Sb., on Accounting, as amended, for accounting units whose objects clause is not business, providing they use the double-entry accounting system.

Decree No. 506/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for the following accounting units: National Property Fund of the Czech Republic and National Land Fund of the Czech Republic.

Decree No. 507/2002 Coll. implementing some provisions of Act No. 563/1991 Coll., on Accounting, as amended, for accounting units using the single-entry system.

Decree No. V/1- 31 388/1992 of 29 December 1992 laying down the structure and content of items of the balance sheet and the income statement for entrepreneurs.

Decree No. V/1-31 370/1992 of 23 December 1992 laying down details of the accounting procedures for sole traders carrying out business activities or other activities generating income under the basis of cash receipts and disbursements.

Decree No. V/20 100/1992 of 15 July 1992 laying down the framework for the chart of accounts and details of the accounting procedures for entrepreneurs.

Decree of the Ministry of Finance of the Czech Republic No. 23/1990 Coll., on Accounting.

Decree of the Ministry of Finance of the Slovak Republic No. 23054/2002-92 of 16 December 2002 laying down details of the accounting procedures and the framework for the chart of accounts for entrepreneurs maintaining accounts under the system of double entry bookkeeping, as amended.

Decree of the Ministry of Finance of the Slovak Republic No. MF/15464/2013-74 of 11 December 2013 laying down details of the structure, description and content of items of individual financial statements for micro accounting entities, as amended.

Decree of the Ministry of Finance of the Slovak Republic No. MF/23377/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for large accounting entities and public interest entities, as amended.

Decree of the Ministry of Finance of the Slovak Republic No. MF/23378/2014-74 of 3 December 2014 laying down details of the structure, description and content of items of individual financial statements for small accounting entities, as amended.

Directive 2013/34/EU of the European Parliament and of the Council on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC 26 June 2013, 2017. Available on the Internet: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0034.

Farkaš, R. 2013. Konsolidovaná účtovná závierka v Slovenskej republike [Consolidated Financial Statements in the Slovak Republic]. Bratislava: Iura Edition, p. 309.

Gulin, D., Spajić, F., Spremić, I., Tadijančević, S., Vašiček, V., Žager, K., Žager, L., Računovodstvo [Accounting], 2003. Zagreb: Hrvatska zajednica računovođa i financijskih djelatnika.

Hladika, M., Mokošová, D., Molín, J. 2017. Comparison of national accounting framework-the case of Croatia, Slovakia and Czechia. In Economy of Eastern Croatia-vision and growth. International scientific symposium. *Economy of Eastern Croatia-vision and growth : 6th International scientific symposium: Osijek, 25-27 May 2017, Croatia*. - Osijek: Sveučilište Josipa Jurja Strossmayera u Osijeku, Ekonomski fakultet u Osijeku.

Hladika, M., Perspektiva primjene modela obračunske osnove i Međunarodnih računovodstvenih standarda za javni sektor u proračunsko računovodstvo u Republici Hrvatskoj [The perspectives of the application of the accrual basis of accounting and the International public sector accounting standards to government accounting in Croatia], 2013, doktorski rad. Zagreb: Ekonomski fakultet.

Huleš J., Jeřábek A, 2001. Act on Accounting valid from 1 January 2002. Bilance, Prague 2001.

Kordošová, A. 2008. Základné zmeny v účtovníctve rozpočtových organizácií v kontexte IPSAS [Basic Changes in Accounting of Budgetary Organisations in accordance with IPSAS]. In *Teória a prax v účtovníctve a v audítorstve-jej miesto v prostredí uplatňujúcom prvky vedomostnej ekonomiky: zborník príspevkov zo štvrtého vedeckého seminára k výsledkom vedeckovýskumnej činnosti Katedry účtovníctva a audítorstva*. - Bratislava: Vydavateľstvo EKONÓM.

Kunitsyna, N.; Britchenko, I.; Kunitsyn, I. 2018. Reputational risks, value of losses and financial sustainability of commercial banks, *Entrepreneurship and Sustainability Issues* 5(4): 943-955. https://doi.org/10.9770/jesi.2018.5.4(17)

Lakis, V., Subačienė, R. 2014. Transformation of Accounting in Lithuania since 1990, Zeszyty teoretyczne rachunkowosci [Theoretical Journal of Accounting], tom 78 (134).Warsaw, SKwP, 177-196.

Lietuvos Respublikos Buhalterinės apskaitos įstatymas [the Law on Accounting] No. IX-574, 6 November, 2001. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.43178AA9832E.

Lietuvos Respublikos Buhalterinės apskaitos pagrindų įstatymas [the Law on the Principles of Accounting] No.I-2654, 18 June, 1992. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.F15B67B048EB.

Lietuvos Respublikos Įmonių finansinės atskaitomybės įstatymas [The Law on Financial Statements] No. IX-575, 6 November 2001. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.132D0D75309C.

Lietuvos Respublikos Įmonių grupių konsoliduotosios finansinės atskaitomybės įstatymas [The Law on Consolidated Financial Statements] No. IX-576, 6 November 2001. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.AB44F084071E.

Lietuvos Respublikos Viešojo sektoriaus atskaitomybės įstatymas [The Law on Public Sector Reporting] No. X-1212, 26 June 2007. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.E2CE2C82DA9E.

Lietuvos Respublikos Vyriausybės nutarimas "Dėl buhalterinės apskaitos ir atskaitomybės organizavimo" [Resolution of Government of Republic of Lithuania Due to Organization of Accounting and Reporting], No. 564, 17 December, 1991. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.D4B6A5A06CB4.

Lietuvos Respublikos Vyriausybės nutarimas "Dėl įmonių, turinčių juridinio asmens teises, metinės finansinės atskaitomybės" [Due to Annual Reporting of Legal Entities] No. 804, 27 October, 1993. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.F85A0C48BCC7.

Lietuvos Respublikos Vyriausybės nutarimas "Dėl viešojo sektoriaus buhalterinės apskaitos ir finansinės atskaitomybės sistemos reformos koncepcijos ir koordinavimo ir priežiūros komisijos sudarymo" [On the Conceptual Framework of the Public Sector Accounting and Financial Reporting System Reform and the Formation of a Commission for the Coordination and Monitoring of the Reform] No. 718, 29 June 2005. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.9B7AEBC5504D.

Lietuvos Respublikos, Vyriausybės nutarimas "Dėl pagrindinių fondų amortizacinių atskaitymų mokestinių normatyvų" [Resolution of Government of Republic of Lithuania Due the taxation rates of amortization deductions of fixed asstes], No. 368, 14 December, 1990. 2017. Available on the Internet: https://www.e-tar.lt/portal/lt/legalAct/TAR.CA1280DE773F.

Mackevičius, J. 2005. Nepriklausomos Lietuvos buhalterinės apskaitos raida ir problemos (1990 – 2005 m.) [Development and Problems of Accounting of Independent Lithuania]. Apskaitos ir audito sistemų integracija į Europos Sąjungos erdvę. Nauji iššūkiai ir galimybės [Accounting and Audit System Integration into European Union Area. New Challenges and Opportunities]. Research papers. Vilnius: Lithuanian chamber of auditors.

Mackevičius, J., Subačienė, R. 2016. Lithuanian Accounting Development Phases and Tendencies, Zeszyty Teoretyczne Rachunkowości [Theoretical Journal of Accounting] tom 88 (144): 87-107. Available on the Internet: http://ztr.skwp.pl/abstracted.php?level=5&ICID=1212005#

Mackevičius, J., Subačienė, R. 2016a. Lietuvos buhalterinės apskaitos Sistema: praeitis, dabartis, perspektyvos [Lithuanian accounting system: past, present and prospects]. Vilnius: Akademinė leidyba.

Mackevičius, J., Zverovich, S., Kazlauskienė, L. 2011. Financial Reporting in Lithuania, Harmonization of SME's Financial Reporting in Emerging CEE Countries, 1 part. WSEAS Press, 138-168.

Mejzlík L., Vítek L., Roe J., 2014. Adjustments to Accounting Profit in Determination of the Income Tax Base: Evolution in the Czech Republic in European Financial and Accounting Journal, No. 4, Year 2014. University of Economics, Prague. Available on the Internet: https://www.vse.cz/polek/download.php?lang=en&jnl=efaj&pdf=127.pdf.

MFRE 2015. Changes in Estonian legal framework and practices of accounting and auditing during 2004–2014. Available on the Internet: http://www.fin.ee/arvestuslal-arengud.

Millere I. Implementing the legislative requirements in Latvian accounting. Vilnius, Accounting & Audit System Integration into European Union Area, new challenges and opportunities. The Papers of International Conference (6-7th October 2005), 2005. – 152.-158.p.

Millere I. Latvijas grāmatvedības vēsturiskās attīstības tendences. Rīga: Latvijas Universitāte, Latvijas Universitātes raksti, 689.sējums, 2005. – 201.-212.pp.

Mokošová, D., Subačienė, R, Hladika, M., Molín, J. 2017. Impact of changes in accounting regulation on sanctions for its violation in selected countries. In Financial Management of Firms and Financial Institutions 2017. 11th International Scientific conference: Ostrava. (print version in proceeding).

Pacter, P. 2016. Estonia, IFRS as global standards: A pocket guide. London: IFRS Foundation.

Parišová, R. 2010. Podnikové kombinácie podľa IFRS [Business Combination in accordance with IFRS]. Bratislava: Iura Edition, p. 173.

Paseková, M.; Müllerová, L.; Crhová, Z.; Svitaková, B. 2018. Impact of reporting of deferred tax on sustainable development of a counry: case of Czech Republic, *Journal of Security and Sustainability Issues* 7(4): 769-779. https://doi.org/10.9770/jssi.2018.7.4(13)

Pravilnik o financijskom izvještavanju u proračunskom računovodstvu, 2015, Official Gazette, No. 3/15, 93/15, 135/15, 2/17, 28/17. [Ordinance for financial reporting in public sector accounting].

Pravilnik o proračunskom računovodstvu i računskom planu, 2014, Official Gazette, No. 124/14, 57/15, 115/15, 87/16. [Ordinance for public sector accounting and chart of accounts].

Pravilnik o strukturi i sadržaju godišnjih financijskih izvještaja, 2008, Official Gazette, No. 38/08, 12/09, 130/10. [Ordinance on the structure and content of annual financial statements].

Pravilnik o strukturi i sadržaju godišnjih financijskih izvještaja, 2016, Official Gazette, No. 95/16. [Ordinance on the structure and content of annual financial statements].

Procházka, D. 2014. The IFRS as Tax Base: Potential Impact on a Small Open Economy in European Financial and Accounting Journal, No. 4, Year 2014. University of Economics, Prague. Available on the Internet: https://www.vse.cz/polek/download.php?lang=en&jnl=efaj&pdf=130.pdf

Raamatupidamise põhimäärus 1990, Riigiteataja [The Regulation on Accounting 1990] https://www.riigiteataja.ee/akt/24041.

Raamatupidamise seadus 1995, Riigiteataja [The Accounting Act] https://www.riigiteataja.ee/akt/28680.

Raamatupidamise seadus 2003–2015, Riigiteataja [The Accounting Act] https://www.riigiteataja.ee/akt/125052012016.

Raamatupidamise seadus 2015–2016, Riigiteataja [The Accounting Act] https://www.riigiteataja.ee/akt/127122016003.

Raamatupidamise seadus 2017, Riigiteataja [The Accounting Act] https://www.riigiteataja.ee/akt/127122016003?leiaKehtiv.

Regulation of the Cabinet of Ministers of Latvia No 201 Regulations on Obligatory Applicable Latvian Accounting Standards.18.10.2015.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Regulations of the Cabinet of Ministers of Latvia No 775 Application Rules of the Law on the Annual Financial Statements and Consolidated Financial Statements.22.12.2015. https://likumi.lv/ta/id/278844-gada-parskatu-un-konsolideto-gada-parskatu-likuma-piemerosanas-noteikumi.

Skálová, J. 2017. Taxes in Accounting. Wolters Kluwer, Prague 2001.

Šlosár, R. 2008. Dejiny účtovníctva na Slovensku [History of Accounting in Slovakia]. Bratislava: Iura Edition, p. 234.

Strichko, E. G. 2013. Costs of Accounting Information Support, *Contemporary Economic Issues* 4. https://doi.org/10.24194/41313

Subačienė, R., Mačerinskienė, A., Budrionytė, R. 2012. Apskaitos standartų harmonizavimas [Harmonization of Accouting Standards] "Accounting, audit, analysis: science in the context of innovation and globalization" research papers of international scientific conference 2012, Vilnius: Vilniaus universiteto leidykla, 713 – 722.

The Law of the Republic of Latvia On Accounting.14.10.1992. http://www.fm.gov.lv/files/gramatvedibaunrevizija/Law%20on%20Accounting%20.pdf.

The Law of the Republic of Latvia On Budget and Financial Management.24.03.1994. https://likumi.lv/doc.php?id=58057.

The Law of the Republic of Latvia On the Annual Financial Statements and Consolidated Financial Statements. 22.10.2015. https://likumi.lv/ta/id/277779-gada-parskatu-un-konsolideto-gada-parskatu-likums.

Zakon o proračunu, 1994, Official Gazette, No. 92/94. [Budget Law].

Zakon o proračunu, 2003, Official Gazette, No. 96/03. [Budget Law].

Zakon o proračunu, 2008, Official Gazette, No. 87/08, 136/12, 15/15. [Budget Law].

Zakon o računovodstvu, 1991, Official Gazette, No. 53/91, 33/92. [Law on Accounting].

Zakon o računovodstvu, 1992, Official Gazette, No. 90/92. [Law on Accounting].

Zakon o računovodstvu, 2005, Official Gazette, No. 146/05. [Law on Accounting].

Zakon o računovodstvu, 2007, Official Gazette, No. 109/07, 54/13. [Law on Accounting].

Zakon o računovodstvu, 2015, Official Gazette, No. 78/15, 134/15, 120/16. [Law on Accounting].

Zakon o registru godišnjih financijskih izvještaja, 2003, Official Gazette, No. 47/03. [Law on registry of annual financial statements]
Zakon o trgovačkim društvima, 1993, Official Gazette, No. 111/93, 34/99, 121/99, 52/00, 118/03, 107/07, 146/08, 137/09, 125/11, 152/11, 111/12, 68/13, 110/15. [Company Law].

Žárová, M. 2013. Could New Accounting Directive Improve European Financial Reporting? – Introduction to European Financial and Accounting Journal, No. 2, Year 2013. University of Economics, Prague. Available on the Internet: https://www.vse.cz/polek/download.php?jnl=efaj&pdf=97.pdf

Бухгалтерский учет в зарубежных странах [Accountancy in foreign countries]. 2007. под. редакцией Ф.Ф. Бутынца. Житомир, ЖГТУ.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Short biographical note about the contributors at the end of the article (name, surname, academic title and scientific degree, duties, research interests):

Dr. Rasa SUBAČIENĖ is the Professor at the Department of Accounting and Audit, Faculty of Economics and Business Administration, Vilnius University, Lithuania. She is a member of editorial board of journals: "ETAP: Economic Theory, Analysis, Practice"; "Latgale National Economy Research"; "Science and Studies of Accounting and Finance: Problems and Perspectives". Research interests: financial accounting, management accounting, analysis of activity of enterprises.

ORCID ID: orcid.org/0000-0001-6559-8478

Lehte ALVER is the Professor at the Department of Business Administration, Faculty of Business and Governance, Tallinn University of Technology, Estonia. She is a member of editorial board of journals: Journal Zeszyty Teoretyczne Rachunkowosci (Theoretical Journal of Accounting), Journal of Accounting and Management Information Systems, Journal of Accounting, Ethics & Public Policy. She is board member and national coordinator of European Accounting Association. Reserach interests: financial accounting, international accounting, accounting history and education.

ORCID ID: orcid.org/0000-0002-0895-3231

Dr. Inta BRUNA is the Professor at the Department of Finance and Accounting, Faculty of Business, Management and Economics, University of Latvia, Latvia. She has been the member of the scientific boards of several international conferences such as: 14th Biennial Conference 2014 for the International Society for the Study of Work and Organizational Values, 2nd Dubrovnik International Economic Meeting (DIEM) 2015 and in partner Universities in Vilnius and Tallinn. Research interests: financial accounting, internal audit, environmental accounting.
ORCID ID: orcid.org/0000-0002-4784-4476

Dr. Mirjana HLADIKA is the Assistant Professor at the Department of Accounting, Faculty of Economics and Business, University of Zagreb, Croatia. Her research interests include financial reporting, financial instruments, the implementation of IFRS, integrated reporting and management accounting. She is a member of editorial board of journals "Računovodstvo i financije" and "Riznica".
ORCID ID: orcid.org/0000-0003-3170-9138

Daša MOKOŠOVÁ, PhD. is the Assistent Professor at the Department of Accounting and Auditing, Faculty of Economic Informatics, at the University of Economics in Bratislava. Research interests: financial accounting, IFRSs, cost and management accounting, corporate governance.
ORCID ID: orcid.org/0000-0003-1829-6957

Jan MOLÍN, PhD. is the Assistant Professor and Deputy Head of Department of Financial Accounting and Auditing, Faculty of Finance and Accounting, University of Economics, Prague. He is a Chairman of Ethical Committee of the Chamber of Certified Accountants and Vice-Charman of the Commitee for Accounting Profession of the Union of Accountants. He is also a Tax Advisor, Examining Commissioner of the Chamber of Tax Advisors of the Czech Republic and Member of the Division for Matters Concerning the Profession of a Tax Advisor at the Chamber of Tax Advisors of the Czech Republic. He is a member of editorial board of the Bulletin of the Chamber of Certified Accountants. Research interests: financial accounting, relation between accounting and taxes, professional liability of auditors, tax advisors and accountants.
ORCID ID: orcid.org/0000-0003-0754-1363

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Appendix 1. Evaluation of accounting regulation evolution

Phases of accounting regulation evolution	Factors influencing development of phases	Peculiarities of phases
The Republic of Croatia		
1991–1992	gaining the independence; transition from social (state) ownership to a private one; social and economic changes	all business entities are in state ownership and accounting is performed as a central planned economy; accounting system is based on detailed rules and instructions; singular system of financial reporting
1993–2005	the first Law on Accounting in independent Croatia is issued; establishment of the Croatian Board for Accounting and Accounting Standards	abandon of accounting system that is based on detailed rules and instructions; chart of accounts is not prescribed; dual system of financial reporting; application of International Accounting Standards for all business entities regardless their size; establishment of Registry of financial statements
2006–2015	changes in accounting regulations are in accordance with Croatia's accession to the EU; establishment of the Board for Financial Reporting Standards	accounting regulation is aligned with Fourth and Seventh EU Directives; development and application of Croatian Financial Reporting Standards; new structure and content of financial statements
2016–present	Implementation of requirements of Directive 2013/34/EU into Croatia Law on Accounting	significant changes in the accounting regulation for micro entities (simplification of legislation)
The Czech Republic		
1990–1991	a shift from a central planned economy to market economy; occurrence of new entrepreneurial entities	approval of the decrees on accounting implementing the act of 1971 on uniform system of social-economic information
1992–2002	approval of the New Commercial Code and need for approving a comprehensive regulation of accounting	approval of the new Act on accounting and implementing decrees of the Ministry of Finance of the Czech Republic
2003–2009	need for a comprehensive regulation of accounting through a legal regulation and for detailed definition of accounting methods for different types of accounting units	the original decrees were replaced with new decrees approved as a legal regulation; Czech accounting standards were issued, defining particular accounting procedures; legal regulation of single-entry accounting was cancelled and replaced with tax record keeping (for natural persons) and intended introduction of double-entry accounting (for legal entities); application of the IFRS was first compulsory, later voluntary
2010–2015	effort to make the information reported by state administration more efficient and effort to compile consolidated financial statements for the Czech Republic	"reform in accounting of state administration" was applied through a new decree for state administration and accounting methods used by accounting entities were applied and decree on consolidation rules for state administration was approved
2016–present	requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 and need to introduce further legislative changes	approval of an extensive amendment to Czech accounting regulations
The Republic of Estonia		
1990–1994	Restoration of the independence. Movement from planned economy to free market.	Regulation of Accounting was adopted. It was an introduction of a fundamentally different accounting system in comparison with the planned economy. Establishment of Estonian Accounting Board.
1995–2002	Formation of accounting system	First Accounting Act was came into force. Accounting Act was supplemented by 16 guidelines which were called as Estonian GAAP. True and Fair View override

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Phases of accounting regulation evolution	Factors influencing development of phases	Peculiarities of phases
		was declared.
2003–2012	Changes in accounting system	New Estonian Accounting Act. The essence of the law is framed in compliance with IFRSs. Two accounting frameworks: Estonian GAAP and IFRSs. Estonian GAAP is based to the IFRSs
2013–2015	Changes in Estonian GAAP: switch from the Full IFRS to the IFRS for SMEs	Estonian GAAP (17 guidelines) is based to the IFRS for SMEs
2016–present	Requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013.	Changes in the Accounting Act: diversification of entities and changes of requirements of the content of annual reports depending on the size of companies. From 2017 the Estonian GAAP was renamed to the Estonian financial reporting standard.
The Republic of Latvia		
1991–1992	restoration of the independence; movement from planned economy to free market; significant changes of economics and social life	the introduction of a fundamentally different accounting system in comparison with the planned economy; the obligation of companies to submit financial statements and disclosure the information
1993–2006	creation of an accounting system; accessing the EU; stronger impact of globalization; beginning of the development of national accounting standards	accounting regulating laws alignment with Fourth and Seventh EU Directives; unified fundamental principle of bookkeeping in public sector; special regulations of Cabinet of Ministers for the accounting organisation; establishment of Methodological Council of an Accounting
2007–2011	necessity of improvement of the rules regarding the accounting regulations; influence of an economic crisis	development of national accounting standards instead adaption the international accounting standards; changes of the content of balance sheet; specified evaluation methods; different audit criteria
2012–2015	stabilization policy of economics; the new setting of the application of a national accounting standards	replacement of the national standards with the Cabinet of Ministers regulations; improvement of the public sector accounting in a post -crisis period
2016–present	requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013;	adoption of the law "On Annual Report and Consolidated Annual Report"; diversification of composition and content of financial reports for different categories of companies
The Republic of Lithuania		
1990–1992	the restoration of independence; changeover from a state ownership to a private one; social and economic changes	accounting performed as a central planned economy accounting system based on detailed rules and instructions
1993–2001	issue of the Law on the Principles of Accounting; establishment of the Institute of Audit and Accounting	accounting regulation started to develop from detail instructions to appliance of principles; regulation of accounting was not consistent, different accounting' spheres were regulated by different level of legislation; enterprises proceeded accounting on tax laws requirements
2002–2015	issue of the Law on Accounting, the Law on Financial Statements, the Law on Consolidated Financial Statements; changes related with the Lithuania's accession to the EU; issue of Business Accounting Standards	the Law on Accounting, the Law on Financial Statements, the Law on Consolidated Financial Statements were complied with the Fourth (78/660/EEC) and Seventh (83/349/EEC) EU directives; Business Accounting Standards were based on International Financial Reporting Standards
2016–present	requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013;	changes, related with this phase made the biggest impact in arrangement of accounting for micro-enterprises

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(11)

Phases of accounting regulation evolution	Factors influencing development of phases	Peculiarities of phases
	amended legislation related with regulation of accounting	
The Slovak Republic		
1990–1992 (CSFR)	changeover from a state ownership to a private one; social and economic changes	accounting performed as a central planned economy accounting system was reformed and substituted by completely new accounting regulation
1993–2002	the restoration of independence	continuing with implemented CSFR´s accounting regulation with later amendments
2003–2013	new set of Slovak accounting regulation issued: Act on Accounting, Decrees on accounting procedures and decrees on financial statements was published because of entrance negotiations of the SR to the EU	implementation of Fourth EU directive (78/660/EEC), the Seventh EU directive (83/349/EEC), the Eight EU directive (84/253/EEC), other EU directives which set additional requirements in specific issues (e.g. individual and consolidated financial statements of banks or insurance companies) and partially IAS/IFRS
2014–present	requirements of Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 implemented	changes, related with this phase made an impact in arrangement of accounting and financial statements for micro and small enterprises, Act on Accounting was amended and new degrees on individual financial statements were published

Source: Composed by authors

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

PERFORMANCE MEASUREMENT ISSUES IN CENTRAL BANKS

Deimantė Teresienė

Vilnius University, Sauletekio av.9, Vilnius, Lithuania

E-mail: deimante.teresiene@ef.vu.lt

Received 20 March 2018; accepted 6 May 2018; published 30 September

Abstract. Central banks play an important role in financial system and are an essential part of overall public sector finances. Monetary policy responsibilities are common to all central banks. Financial stability is another area of central bank activity. Central banks provide financial stability by controlling the actions of the commercial banks. Central banks also are as lenders of last resort and payment mechanism managers. But the key issue in this article is to concentrate on foreign reserves management as a source of bank profit. The aim of this research is to create a performance valuation framework which could help to compare foreign reserves management results in different central banks. Quantitative and qualitative reasearch methods are used in this article. For quantitative analysis various statistical techniques are used and for qualitative analysis the main method is a case study. There are a lot of measures for commercial banks sector valuation but in practice we see a lack of analysis tools for central banks performance measurement. Foreign reserves management is an on-going process aimed at maximizing expected return over a defined investment horizon. Valuing foreign reserves management results we should concentrate on specified risk budget and the opportunity to have different kind of assets in the investment portfolio.

Keywords: central banks; foreign reserves; performance measurement

Reference to this paper should be made as follows: Teresienė, D. 2018. Performance measurement issues in central banks, *Entrepreneurship and Sustainability Issues* 6(1): 176-189. http://doi.org/10.9770/jesi.2018.6.1(12)

JEL Classifications: E58, G2

1. Introduction

Despite the fact that central banks control a substantial sum of wealth there is little published about the asset allocation process for foreign reserves management. The majority of public research has been focused on optimal level of foreign reserves but not to the issues how these reserves are managed. From theoretical point of view central banks are not profit seekers but in practice the situation is quite different. The finances of central banks have not yet attracted scientists' attention. But it makes sense to analyse central banks' results as they are a source

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

of government income and central banks' gains and losses belong to society. In most cases, governments are the main shareholders to whom central banks distribute their profits.

Some central banks have private shareholders which usually receive predefined dividends which can be limited in law. In the literature we can find that most central banks which were created before 1935 had private owners. The nationalization process started in 1935 and the first nationalized central bank was in New Zealand. Later central bank in Denmark (1936) and Bank of England (1946) were nationalized. Nowadays there are some central banks which have private ownership. The latter central banks are in Belgium, Greece, Italy, Japan, South Africa, Switzerland, Turkey and the Federal Reserve.

According to Bank of International Settlement financial results may be important for central bank despite it can create money to pay its bills because losses or negative capital can raise doubts about central bank's ability to deliver on policy targets. Having losses central banks can face poltical pressure. So it could be the reason why central banks use net income to build reserves against future losses. Sometimes a part of built reserves central banks transfer to the Government even if they have a loss for accounting period.

Igor Goncharov, Vasso Ioannidou and Martin Schmalz in their article "(Why) do central banks care about their profits" (2017) presented the results that central banks are significantly more likely to report positive profits than slightly negative profits despite the fact that they are not profit seekers. Those mentioned authors described also political and public pressure in the cases when central bank discontinues profit distribution to the government. Of course in such kind of situations central banks are when they have a loss. So, according to these findings, and also valuing practical issues, and including the fact that central banks seek financial independence the conclusion can be made that profitability principle in foreign reserves management framework is not the last principle that central banks care about. Knowing the main investment portfolio principles there can be rised a debate that nowadays we have non-traditional central banking.

Daniela Bunea, Polychronis Karakitsos and others in ECB occasional paper series artice "Profit distribution and loss coverage rules for central banks" (2016) wrote that the main driver for central banks performance management is the extent to which policy objectives: controlling inflation or achieving financial stability were achieved. According to the authors, profit maximization is not, and must not be, a goal for central banks. But this idea can not be taken without any conditions. If central bank is granted financial and institutional independence then it should include profit seeking in its strategic aims. According to ECB paper, there can be different approaches of profit disstribution to government:

1. a fixed percentage of the current net profit is distributed;

2. a fixed percentage of the current net profit is allocated to reserves without any reference to a limit for these reserves;

3. an amount between zero and a maximum percentage of the current net profit is allocated to reserves;

4. a (usually fixed) percentage of the current net profit is allocated to reserves until these reach a certain target level which is usually a proportion of a particular balance sheet item;

5. no value or percentage is defined in the legal framework in relation to distribution.

The aim of this article is to create a performance valuation model which could help to compare different central bank financial results from the point of foreign reserves management return. In order to achieve the main goal of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

this research some objectives were set. The first objective is critically to assess the impact of foreign reserves management governance to investment results. The second objective is to identify the connection between the size of foreign reserves portfolio, risk budget, limit system and central bank's performance results. And finally, the last objective is to evaluate the influence of tendencies in financial markets on central bank's profit.

In this research were analysed 191 institutions: central banks and monetary authorities. The main limitations were that central banks do not disclose enough information about foreign reserves management process and especially they do not want to disclose investment performance results. But it is not a good practice and centrtal banks should be more opened to society.

This article consists of some sections. Section 2 presents a review of the literature on foreign reserves management governance and the research of different central banks' results. Section 3 presents central banks' performance valuation framework and in section 4 there is presented a case study of Swiss National Bank performance results.

The methods used in this research are analysis of scientific literature, statistical data analysis, case studies.

2. Foreign reserves management governance and investment results

According to International Monetary Fund (IMF) "Revised guidelines for foreign exchange reserve management" (2013), reserve management is a process that ensures that adequate official public sector foreign assets are readily available to and controlled by the authorities for meeting a defined range of objectives for a country or union. These revised Guidelines are used by most central banks as a set of basic principles in formulating sound reserve management policies and practices. Revised Guidelines provide a more comprehensive coverage of risk than the 2001 Guidelines.

IMF in the 2013 Guidelines explains the main objectives of holding official foreign reserves. So every country needs foreign reserves for:

1. "support and maintain confidence in the policies for monetary and exchange rate management, including the capacity to intervene in support of the national or union currency;

2. limit external vulnerability by maintaining foreign currency liquidity to absorb shocks during times of crisis or when access to borrowing is curtailed, and, in doing so;

3. provide a level of confidence to markets that a country can meet its current and future external obligations;

4. demonstrate the backing of domestic currency by external assets; assist the government in meeting its foreign exchange needs and external debt obligations;

5. maintain a reserve for national disasters or emergencies." (IMF "Revised Guidelines for Foreign Exchange Reserve Management").

The specific objectives of holding foreign exchange reserves can differ in various countries but the fact that reserves are held by central banks to guard against rainy days can be stated as general objective in all countries.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

The author John Nugee (2001) from the Bank of England in his paper "Foreign exchange reserves management" explained that there can be and specific obectives, as for example, reserves can be held as an investment fund, primarily for financial gain. The author stressed that before creating a framework for foreign reserves management and creating benchmarks the Board should be familiar with the foreign reserves holding objectives.

Foreign reserves usually are managed using three broad investment parameters, which are broadly known as main principles for reserve managemet. These principals are safety, liquidity and profitability. After analysing different central banks the results have shown that some central banks have diversification and reputational principles (cases of Czech Republic and Canada).

Foreign reserves managers have to take important decisions that influence their choices with respect to asset allocation, currency composition and asset classes, while ensuring that they meet the three main goals of capital preservation, liquidity and income generation.

After analysing different central banks' foreign reserves management policies the conclusion can be made that there is no one unique foreign reserves management framework. In some central banks there can be four levels of decision making processes and in others there are three or two levels. If there are four levels for foreign reserves management then there are long term investment decisions, strategic asset allocation, tactical asset allocation and at the lowest level there is investment portfolio management with internal or external management. Four level foreign reserves management framework is used in Swiss National Bank.

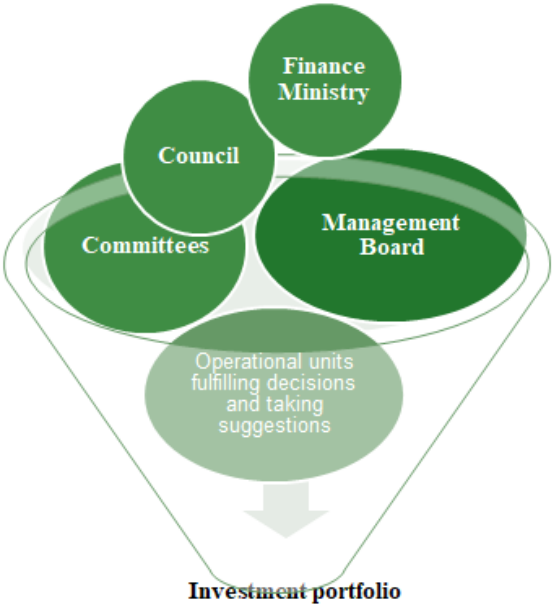


Fig.1. Levels of decision making
Source: Done by author

In figure 1 we can see different levels of foreign reserves management decisions. As the research showed in some countries Finance Ministry participates in decision taking process but it is not very common case. In some cases there can be Council and Management Board but the more common practice is that central bank has only Management Board. Usually central banks have different committees (Investment committee or Risk management committee), but the role of committees can also fulfill a group of responsinble operational units.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

3. Performance measurement framework

After analysing the main aspects of foreign reserves management governance and decision taking process it is important to analyse how decisions taking at the top level can influence foreign reserves management results.

Usually politicians and society like to compare different central banks or monetary authorities' financial results just looking at the final net profit. But this type of analysis could not be done as those institutions have different abilities for profit generation. As for example, if a Board in a central bank or monetary authority is very conservative and doesn't want to take more risk by allowing to include more risky asset into foreign reserves portfolio than in the economic growth cycle such central banks will generate less attractive financial results.

In figure 2 there are the results which were made in 1991 and announced by Brinson, Hood & Beebower in the article "Determinants of Portfolio Performance" in Financial Analysts Journal. In 2018 the World Bank once again presented those findings as suitable drivers for nowadays long term investment success. The main driver of long term investment success is strategic asset allocation. Strategic decisions are taken at the top level. After analysing 191 different monetary policy institutions can be made a conclusion that usually these types of decisions are taken at the Board or Management level. Sometimes Finance Ministery can set some guidelines but they are usually very broad. Under the strategic asset allocation, the Management Board usually determines currencies and asset classes in which foreign exchange reserves can be invested. The Management Board also sets limits and risk tolerance for foreign reserves investments.

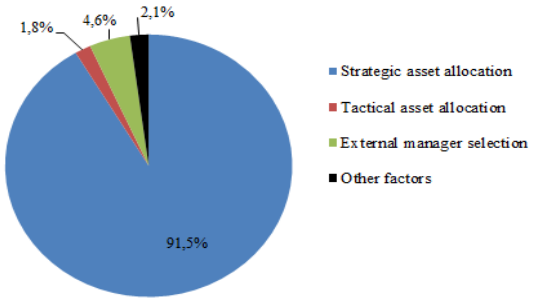


Fig.2. Key drivers of long-term investment success
Source: World Bank, Reserves Advisory and Management Program, Market Risk, Indexation of Treasury Securities and Performance Measurement, January 22-26, 2018 | Paris, France

Foreign reserves can be managed internal or external. Looking at the figure 2 we can see that external manager selection is another important factor for better foreign reserves management results. The main explanation for that could be diversification effect as external managers can have different views on financial markets or can use more sophisticated investment strategies. Tactical asset allocation is another factor which can add value to investment results and in other factors we can include practical portfolio managers' decisions, which are called "Alpha".

After analysing many central banks it can be said that strategic asset allocation decisions, taken at the Board level, had the biggest impact on financial results. The main point here is the structure of strategic benchmark. Portfolio size can create more opportunities for investment return but it is not the main factor. Some central banks, having huge foreign reserves can even generate loss if the bank is very conservative and does not want to take more risk in low or even negative yields environment. Without risky decisions conservative central bank also will not achieve good results in increasing yield cycle as values of bonds portfolios will decrease.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

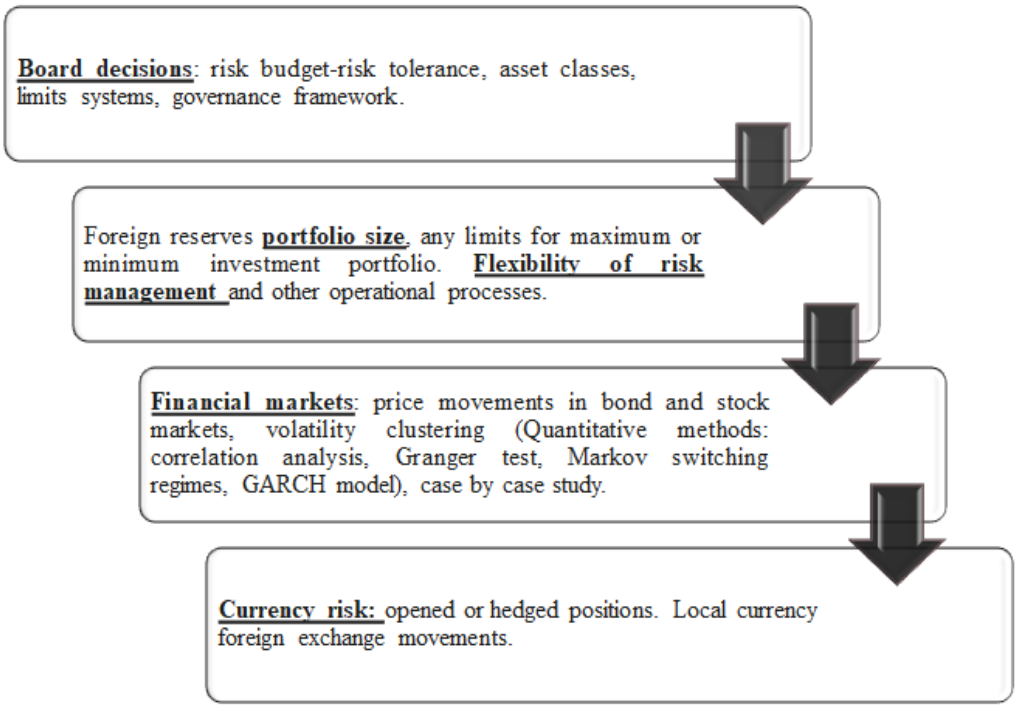


Fig.3. Central bank's performance measurement framework
Source: Done by author

In figure 3 is shown the central bank performance measurement framework which can be used in comparing different central banks results. But the main idea of this framework is to pay attention to main factors which can influence foreign reserves management results. So once again can be mentioned that the main factor is going from the top level and then we should value tendencies in financial markets and finally currency risk exposure.

4. Case study: Swiss National Bank

For the case study analysis Swiss National Bank (SNB) was taken because this central bank achieved impressive profit in 2017. The Swiss central bank announced that expects a record 54 billion CHF profit in 2017.

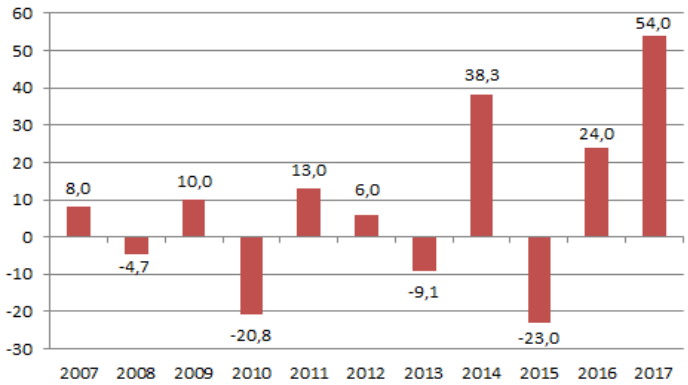


Fig. 4 SNB profit in billions CHF

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

According to the central bank performance measurement framework, which was presented in section 3 the analysis of Swiss central banks results should be started from governance framework and Government Board decisions. Swiss National Bank has four level foreign reserves management framework. At the top level there is long term asset allocation with 5 year investment horizon. At this level responsibility is taken by the Governing Board, guideline – function of currency reserves and tasks: appropriate long-term risk/return profile or risk tolerance.

Table 1. Foreign reserves management levels

Long-term asset allocation (LAA) 5y-Horizon	• Responsibility: Governing Board • Guideline: Function of currency reserves • Tasks: Appropriate long-term risk/return profile (risk tolerance)
Strategic Asset Allocation (SAA) 1y-Horizon	• Responsibility: Governing Board • Guideline: LAA&monetary policy restrictions • Tasks: Valuation-based deviations from LAA & benchmarks
Tactical asset allocation (TAA) 3 month – Horizon	• Responsibility: Investment Committee • Guideline: SAA&guidelines and limits • Tasks: Tactical allocation and benchmarks
Portfolio management (Internal/External)	• Responsibility: Portfolio managers • Guideline: Tactical benchmarks • Tasks: Implementation of TAA, generation of „Alpha“

Going from the top at the second level in central bank foreign reserves management framework is strategic asset allocation with one year investment horizon. The responsibility is taken by Governing Board. Guideline: long term asset allocation and monetary policy restrictions. The main tasks of strategic asset allocation are valuation based deviations from long term asset allocation and benchmarks. After strategic asset allocation tactical decisions should be taken. Tactical asset allocation has investment horizon of three months. Responsibility is taken by Investment Committee. The guideline: strategic asset allocation, guidelines and limits. The main tasks in this level are tactical allocations and benchmarks. And finally at the lowest level practical portfolio management decisions should be taken. Portfolio management can be internal or external. At this stage portfolio managers take the responsibility for thier decisions. The main tasks of porfolio managers are to implement tactical asset allocation decisions and generate „Alpha“.

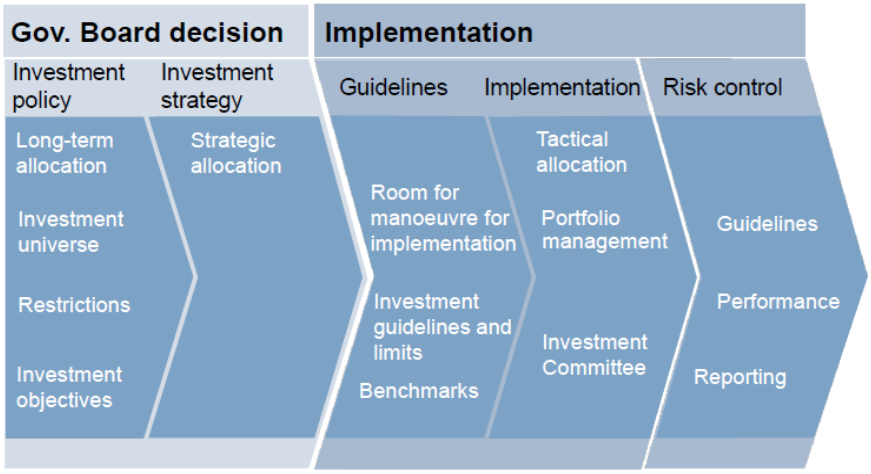


Fig. 5 Gov. Board decision and implementation
Source: Swiss National Bank

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

In figure 5 we see that a lot of attention before analysing central bank results should be paid to long-term and strategic allocation. So it is very important to look at central bank asset classes which are able to include into a foreign reserves portfolio.

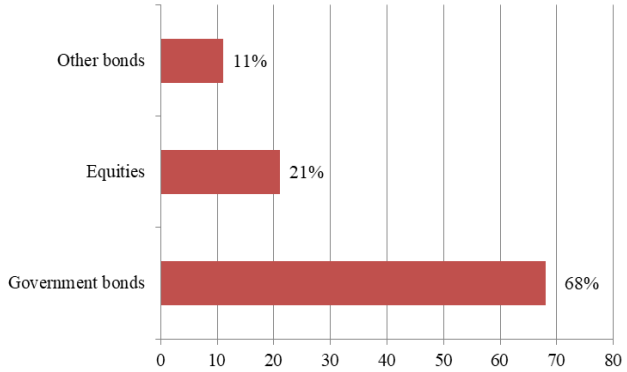


Fig. 6 Foreign exchange reserves: asset classes, in percents
Source: Done by author using Swiss National bank data

In the Swiss National Bank's foreign exchange reserves structure we can see a significant part of equities. Comparing with other central banks it is quite modern foreign reserves management profile. But at the same time we should remember that Swiss National Bank has private shareholders which are interested in performance results and stock price volatility.

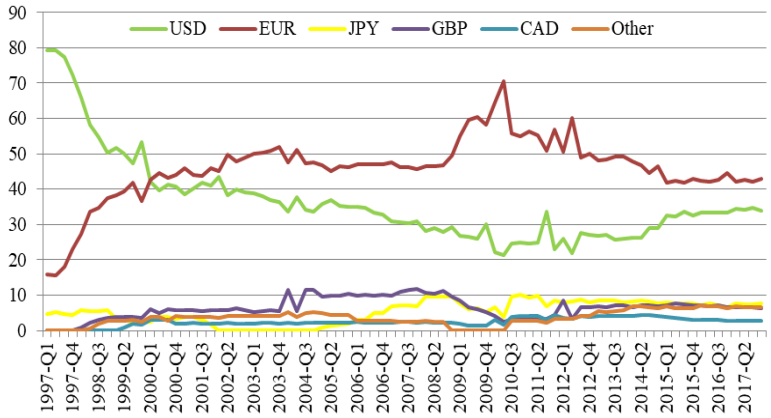


Fig. 7 Currency structure of Swiss foreign reserves, in percents

SNB foreign reserves are not only well diversified by different asset classes but also have diversified currency structure (fig. 7). This time portfolio size can also be a good factor as Switzerland takes the third place by foreign reserves amount.

According to central bank's performance measurement framework now it is important to look at the tendencies in financial markets. Before that we should have in mind the fact that Switzerland's central bank increased allocation to equities. The other important thing is that the SNB is the world's eighth biggest public investor.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

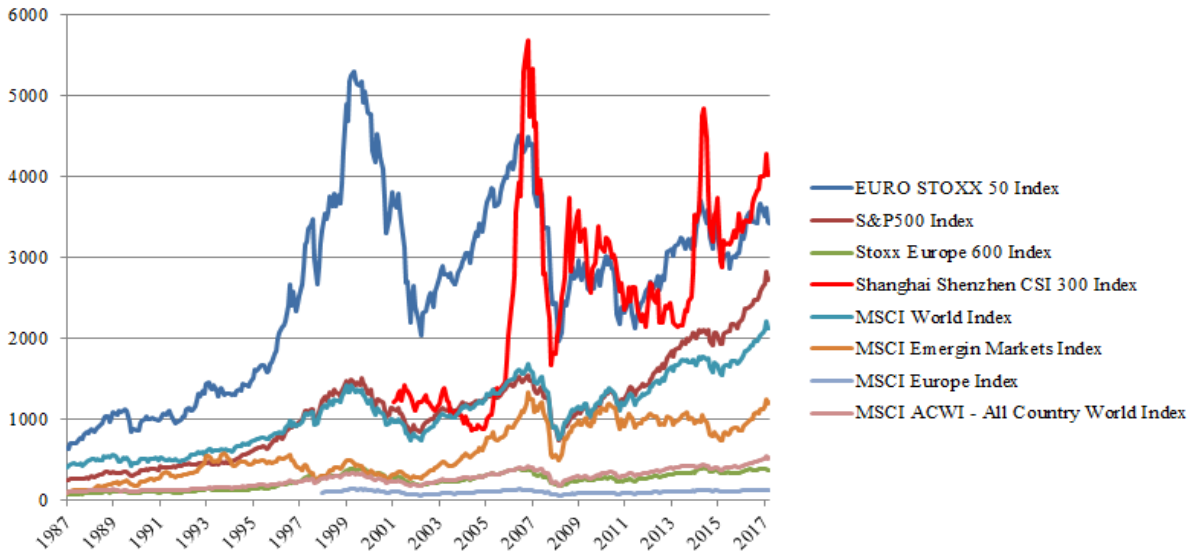


Fig. 8 Tendencies in stock market
Source: Bloomberg

Stock markets' indices in 2017 increased all over the world. So SNB had very good performance results because of positive stock market effect. Increasing equity share in economic growth cycle SNB achieved impressive financial results.

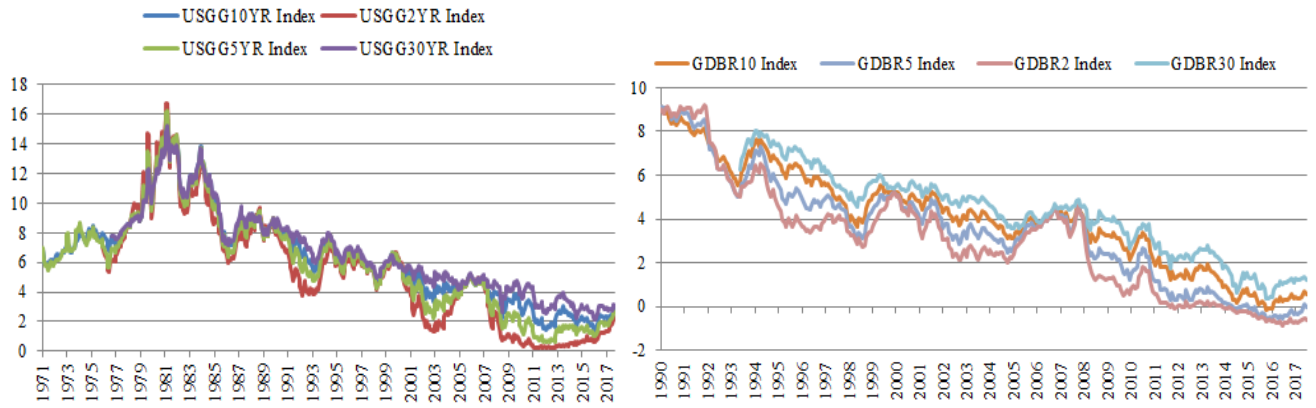


Fig. 9 US and Germany government bond yields' dynamic

Bond yields are still low but step by step increasing because of changing monetary policy. In 2017 bond yields had a tendency to increase so it has an impact on lower portfolio market value.

In table 2 we can see SNB investment performance results from 1999 to 2016. Very important factor which is very obvious is currency risk.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

Table 2 SNB investment performance

Investment performance						
	Currency reserves					Swiss franc bonds
	Total in CHF	Gold in CHF	Foreign exchange reserves			Total in CHF
Return on investments (1)			Total in CHF	Currency return	Local return	
1999			9.7%	9.2%	0.4%	0.7%
2000	3.3%	-3.1%	5.8%	-2.0%	8.0%	3.3%
2001	5.2%	5.3%	5.2%	-1.2%	6.4%	4.3%
2002	1.4%	3.4%	0.5%	-9.1%	10.5%	10.0%
2003	5.0%	9.1%	3.0%	-0.4%	3.4%	1.4%
2004	0.5%	-3.1%	2.3%	-3.2%	5.7%	3.8%
2005	18.9%	35.0%	10.8%	5.2%	5.5%	3.1%
2006	6.9%	15.0%	1.9%	-1.1%	3.0%	0.0%
2007	10.1%	21.6%	3.0%	-1.3%	4.4%	-0.1%
2008	-6.0%	2.2%	-8.7%	-8.9%	0.3%	5.4%
2009	11.0%	23.8%	4.7%	0.4%	4.4%	4.3%
2010	-5.4%	15.3%	-10.1%	-13.4%	3.8%	3.7%
2011	4.9%	12.3%	3.1%	-0.8%	4.0%	5.6%
2012	2.3%	2.8%	2.2%	-2.3%	4.7%	3.7%
2013	-2.5%	-30.0%	0.7%	-2.4%	3.2%	-2.2%
2014	8.0%	11.4%	7.8%	2.6%	5.1%	7.9%
2015	-4.7%	-10.5%	-4.4%	-5.6%	1.3%	2.3%
2016	3.8%	11.1%	3.3%	-0.4%	3.7%	1.3%
2017	7.2%	7.9%	7.2%	2.9%	4.2%	-0.1%
(1) Cumulated returns, time-weighted daily.						

Source: Swiss National Bank

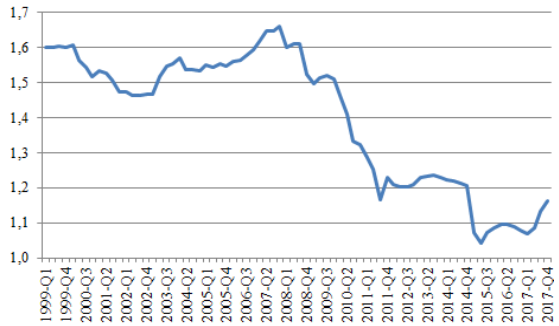


Fig. 10 CHF/EUR
Source: Bloomberg

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

In 2017 a drop in the franc against the euro helped to achieve better investment results and generate impressive net profit for the year.

Table 3. SNB stock price information

In Millions of CHF except Per Share	FY 2014	FY 2015	FY 2016	FY 2017	Current
Last Price	1 060,00	1 099,00	1 750,00	3 889,00	5 660,00
Period-over-Period % Change	1,44	3,68	59,24	122,23	
Open Price	1 065,00	1 069,00	1 095,00	1 780,00	5 700,00
High Price	1 150,00	1 400,00	2 120,00	4 724,00	5 760,00
Low Price	991,00	980,00	1 028,00	1 615,00	5 600,00
Market Capitalization	106,0	109,9	175,0	—	566,0
Current Shares Outstanding	0,10	0,10	0,10	0,10	0,10
Equity Float	0,08	0,08	0,08	0,08	0,08

Source: Done by author using Bloomberg data

Table 4. SNB financial results

In Millions of CHF except Per Share	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Interest Income – Investments	-15 302,6	4 344,0	-2 917,9	5 501,2	—
Net Interest Income	—	—	-2 917,9	—	—
Trading Gains (Losses)	3 131,6	34 487,7	-19 943,0	19 365,8	—
Other Gains (Losses)	3 426,3	12,1	11,6	13,6	—
Salaries Wages and Employee Benefits	172,6	150,2	157,7	160,6	—
Depreciation Expense	39,0	37,6	39,0	38,8	—
Other Operating Expenses	25,5	233,6	86,9	74,2	—
General and Administrative Expenses	96,9	109,6	117,6	130,6	—
Operating Income	—	38 312,9	-23 250,6	24 476,4	—
Equity In Earnings of Affiliate/Joint Ventures	-2,1	—	—	—	—
Income Before Income Taxes	-9 076,6	38 312,9	-23 250,6	24 476,4	—
Total Cash Common Dividends	0,0	1,5	1,5	1,5	—
Weighted Avg. Shares - Basic & Diluted	—	—	—	—	0,1
Net Income	**-9 076,6**	**38 312,9**	**-23 250,6**	**24 476,4**	**54 371,6**
Salaries Wages and Employee Benefits	172,6	150,2	157,7	160,6	—
Depreciation Expense	39,0	37,6	39,0	38,8	—
Equity In Earnings of Affil/Joint Ventures	-2,1	—	—	—	—
Pension Expense (Income)	44,3	16,2	19,1	19,3	—
Weighted Avg. Shares - Basic & Diluted	0,1	0,1	0,1	0,1	—
Trading Gains (Losses)	3 131,5	34 487,8	-19 943,0	19 365,9	—
Other Gains (Losses)	3 426,4	12,2	11,6	13,4	—
Interest Income – Investments	-15 374,5	4 278,0	-2 982,2	3 918,7	—
Interest Expense – Other	7,5	8,9	2,3	-1 522,0	—
Total Interest Income	79,4	74,8	66,5	60,6	—

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

Employer Contribution (Pension)	—	18,1	19,1	19,3	—
Auditors Remuneration For Audit	0,4	0,3	0,3	0,3	—
Other Employee Costs	39,3	6,9	7,6	9,1	—
Wages And Salaries	111,1	116,7	122,2	123,2	—
Social Security Costs	22,3	26,6	27,9	28,3	—

Source: Done by author using Bloomberg data

After analysing SNB foreign reserves management framework and central bank's results the conclusion could be made that in this case we had very modern and with big risk tolerance top level decisions and very positive movements of assets prices and currency risk effect. SNB can not be compared to other central banks because of it size, risk tolerance and local currency movements. The main thing which can be taken is openness of SNB. Of course this is because of private investors but this practice of openness could be implemented and in other central banks also.

Conclusions

This paper presents the main issues in central banks' performance valuation. Usually central banks face political and public pressure when they get loss and usually politicians like to compare and value different banks results. But the problem is that we cannot just take net profit of various central banks and value if its performance is good or bad. The first point we should look at is the structure of strategic asset allocation. Board decisions and risk profile is the most important aspects in central bank performance measurement. Even knowing this factor it is very difficult to compare central banks results because after research of a lot of central banks' public information, the conclusion can be made that central banks do not disclose their investment policy in great details. Especially in most cases when they do not have private shareholders.

The other aspect that should be taken into consideration is the size of foreign reserves portfolio. After analysing different central banks results the conclusion can be made that the size of portfolio matters but it is not the main factor.

And finally the other factor, which should be included in performance valuation, is tendencies in financial markets. It is very important to value the tendencies of different asset classes which are in foreign reserves portfolio and the other aspect is to pay attention to its size comparing with other asset classes. And at the end of analysis we have to value the effect of currency risk exposure as sometimes it can be one of the main factor explaining central bank's results.

Central banks' performance valuation issues are interesting topic which should be analyzed in more details as central banks play a very important role in economy. After this research we can make an assumption that central banks will improve their public communication and will explain their performance in more details, especially about foreign reserves management.

For further research it would be interesting to create central banks performance measurement ranking system in order in a right way to compare different central banks' results.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

References

Archer, David; Moser-Boehm, Paul. 2013. Central bank finances. BIS papers No 71. Retrieved from: https://www.bis.org/publ/bppdf/bispap71.pdf

Bloomberg terminal data

Bunea, Daniela; Karakitsos, Polychronis; Merriman, Niall; Studener, Werner. 2016. Profit distribution and loss coverage rules for central banks. Occasional Paper Series No169. Retrieved from: https://www.ecb.europa.eu/pub/pdf/scpops/ecbop169.en.pdf?f7073b79c2f6f62c79918dc24088dd00

Central bank and monetary authority websites. Retrieved from: https://www.bis.org/cbanks.htm

Fisher J., Stephen. Asset allocation for Central Banks. First degree global asset management. Research paper. Retrieved from: http://www.firstdegree.asia/assets/asset-allocation-for-central-banks.pdf

Goncharov, Igor; Ioannidou, Vasso; Schmalz, Martin. 2017. *(Why) do central banks care about their profits?* Available at SSRN: https://ssrn.com/abstract=2979887 or http://dx.doi.org/10.2139/ssrn.2979887

Investment Policy Guidelines of the Swiss National Bank (SNB). 2015. Retrieved from: https://www.snb.ch/en/mmr/reference/snb_legal_richtlinien/source/snb_legal_richtlinien.en.pdf

Maechler, M. Andrea. 2016. Investment policy in times of high foreign exchange reserves. *Money Market Event. Swiss National Bank, Zurich.*

Mminele, Daniel. 2013. Establishing a proper governance framework for central bank reserves management. BIS central bankers' speeches. Retrieved from: https://www.bis.org/review/r130312h.pdf

Nugee, John. 2001. *Foreign exchange reserves management*. Centre for Central Banking Studies. London: Published by Bank of England.

Nugee, John. 2015. Current issues in central bank reserves management. Hong Kong Monetary Authority. Proceedings of OeNB Workshops No. 20.

Schroders. 2016. Equities in reserve portfolios. For professional investors and advisers only.

Smith, Gary; Nugee, John. 2015. The changing role of central bank foreign exchange reserves. Official Monetary and Financial Institutions Forum.

Vinals, Jose. 2013. Prepared by the Monetary and Capital Markets Department. International Monetary Fund. Revised Guidelines for Foreign Exchange Reserve Management. Retrieved from: https://www.imf.org/external/np/pp/eng/2013/020113.pdf

World Bank, Reserves Advisory and Management Program, Market Risk, Indexation of Treasury Securities and Performance Measurement, January 22-26, 2018 | Paris, France

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(12)

Deimante TERESIENE is Associated Professor at Vilnius University. Her research interests are: Monetary policy, Financial markets, Ethics in finance, Corporate finance, Banking, Portfolio construction and management.
ORCID ID: orcid.org/0000-0002-8107-1964

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

INFORMATION SUPPORT OF THE CIRCULAR ECONOMY: THE OBJECTS OF ACCOUNTING AT RECYCLING TECHNOLOGICAL CYCLE STAGES OF INDUSTRIAL WASTE

SvetlanaVegera[1], Alena Malei[2], Ina Sapeha[3], Volha Sushko[4]

[1,2,3,4] Polotsk State University, Novopolotsk, Blohina str.29, The Republic of Belarus

E-mails:[1] svegera@mail.ru; [2]maleialena@yandex.by; [3]golden135@yandex.by; [4]sush.olga@rambler.ru;

Received 28 March 2018; accepted 20 May 2018; published 30 September 2018

Abstract. Circular economy is one of the imperatives of sustainable development of production and society as a whole, which poses corresponding challenges to existing accounting system. In modern conditions of transition from industrial to post-industrial economy, the problem of maintaining a favorable environment and rational use of natural resources requires an adequate transformation of accounting methodology, oriented to the reproduction and sustainable use of natural resources, and not maximum revenue from their exploitation. At present, there is no complete system of accounting for production waste, which would allow solving tasks, which are set by the circular economy, which determines the relevance of the research topic. The purpose of this research is the determination of technological cycle stages of industrial waste and the identification of accounting objects arising at these stages for further recommendations development of industrial waste assessment and accounting for the curcular economy purposes. Among the methods used in the study, the authors identify synthesis, analysis, comparison, logical generalization, inference by analogy, classification, grouping etc. In this article, technological cycle stages of industrial waste will be considered (Stage 1 "Appearance", Stage 2 "Collection and Accumulation", Stage 3 "Waste Preparation for Use", Stage 4 "Storage", Stage 5 "Use", Stage 5 "Burial (destruction)" and identified the objects of their accounting: waste of ferrous and non-ferrous metals, construction waste, waste arising from reservoirs cleaned), as well as costs due to the specifics of technological cycle stage.

Keywords: industrial waste; technological cycle; costs; waste of ferrous and non-ferrous metals; construction waste and waste arising from reservoirs cleaned

Reference to this paper should be made as follows: Vegera, S.; Malei, A.; Sapeha, I.; Sushko, V. 2018. Information support of the circular economy: the objects of accounting at recycling technological cycle stages of industrial waste, *Entrepreneurship and Sustainability Issues* 6(1): 190-210. http://doi.org/10.9770/jesi.2018.6.1(13)

JEL Classifications: M, M4, M41

Additional disciplines: law; ecology and environment; environmental engineering

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

1. Introduction

One of the indicators of sustainable development proclaimed by United Nations is the requirement to significantly reduce waste generation by 2030 through the prevention, reduction, recycling and reuse [1]. Accordingly, in conditions of getting closer to the goal of providing sustainable patterns of consumption and production, the circular economy is the imperative in modern society. This economy has a restorative and withdrawn character [2]. The circular economy is designed to replace the linear "take, make, dispose" economic model with the "take, make, reuse" model. It is characterized by minimization of consumption of primary raw materials and volumes of processed resources, reduction of waste directed to disposal, while reducing the area occupied by the relevant landfills [3]. According to Achim Steiner, the head of the United Nations' Development Program, with the implementation of the circular economy principles, world economic growth can become stable and fair, and the welfare of all countries can increase, while reducing global consumption of materials and energy [4]. The experts who signed the Summary of the World Circular Economy Forum 2017 (Finland, Helsinki) agree that the circular economy offers significant benefits, including economic, environmental and social benefits such as increased profits, lower carbon emissions, cleaner production methods and creation of new jobs. However, the transition to the circular economy requires a completely new thinking, as well as a new approach to the process of product development [4].

For the Republic of Belarus, the issues of ecology and waste management are also relevant, as more than 40 million tons of waste are generated annually [5]. The National Strategy for Sustainable Social and Economic Development of the Republic of Belarus for the period up to 2030 defines the strategic goal of the state policy of the country in the field of waste management in three key areas, which correspond to the the circular economy principles:

1) The maximum reduction in waste generation in all sectors of the economy,
2) Prevention of harmful impact of waste on the environment and health of citizens,
3) The most complete involvement of waste in the economic circulation as a secondary raw material.

The neccessity in protection of human from himself and the results of the technogenic revolution was proclaimed by the Declaration of the United Nations Conference on the Human Environment in 1972. It says: "The protection and improvement of the human environment for present and future generations has become a major goal of humanity - the goal that must be achieved jointly and in accordance with established and basic goals of peace and international economic and social development".

Despite the fact that this happened more than 45 years ago, significant changes in economic relations, reflecting the principles of environmental management, including the widespread implementation of the circular economy, are still at the stage of its development. At the same time, the development in different economic knowledge sectors is proceeding at different rates, somewhere faster, somewhere slower. The obvious lag is traced in accounting system, since no such tasks have been set up to date. However, the implementation of the circular economy requires some information base both for analyzing its development and for personalizing responsibility for the results of economic activity, identifying their (not) correspondence with the declared principles of full involvement of waste in economic circulation as secondary raw materials at the level of each business entity.
While investigating the development of environmental and economic thought and its impact on the accounting system, the Ukrainian scientist I.V. Zamula stresses that ignoring environmental problems is due to people's behavior, which corresponds to maximization of profits. Being the basis of the behavior of "homo economicus", economic rationality predetermined the pragmatic nature of accounting. The basis of the industrial economy was the scale of production, which ensured competitiveness in the market. In this connection, corresponding

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

development of accounting methods, in particular cost accounting and calculation, has become the efficiency ensurance of an enterprise in the industrial society, has armed the economic entities in their competitive opposition [6, p. 47 – 48].

Strengthening profit maximization principle based on the spread of the principle in the economic theory of rationality contributed to the elimination of the owner of capital interest in saving the environment. Modern economic theory consolidated such a system of economic motives, goals and principles of their implementation, which favored destructive tendencies in the process of human development [6, p.76 - 77].

Thus, an important feature of the industrial economy influence on the accounting system was the idea, that economic growth and profit maximization did not require accounting to generate information on the environmental performance of activities and their impact on economic indicators both at the micro- and at macrolevels. Maximization of profit and equity of an individual organization was often carried out due to the predatory use of the natural factor, the deterioration of the ecological state of natural resources, in other words, at the expense of natural capital as part of public national wealth.

In modern conditions of transition from industrial to post-industrial economy, the problem of maintaining a favorable environment and rational use of natural resources requires an adequate transformation of the accounting methodology, oriented to the reproduction and sustainable use of natural resources, and not the maximum revenue from their exploitation [7].

At present, there is no complete accounting system for production waste, which would allow solving the tasks set by the circular economy. Despite the fact that the issues of accounting and waste assesment are reflected in some legal documents and economic literature, there are a number of unexplored issues in this area, which causes the relevance of the chosen topic.

In particular, in economic and normative literature there is only a general approach that does not take into account the specific nature of various kinds of waste. Investigating the practice of economic entities on waste management has shown that this is an extremely expensive process. Many of them account it according to the classical canons as a production process, but such an approach is not acceptable to waste, since it acts as a demotivating factor. The product obtained as the result of waste processing estimated by the cost method can not be realized on the market with the costs incurred. In this regard, completely different approaches are required to organize the accounting of waste and costs associated with their circulation, which poses the appropriate challenges to the existing accounting system.

At the same time, for the development of an integrated system for assesment, documentation, synthetic and analytical waste accounting, it is necessary initially to clearly identify the relevant accounting objects throughout the entire process of waste management, to develop principles and methodological approaches for building an integrated system for the accounting of industrial waste.

The purpose of this study is to distinguish technological cycle stages of industrial waste recycling and to identify the accounting objects at these stages. Setting of the purpose has determined the necessity of solving following problematic aspects: classification of industrial waste as an objects of accounting; determination of the technological cycle stages of industrial waste; identification of accounting objects at technological cycle stages of industrial waste in order to develop further recommendations for assessment and accounting of industrial waste.
The object of the research is industrial waste at technological cycle stages in the petrochemical complex.

In the conducted research, the following methods of scientific research are used: analysis and synthesis, comparison, logical generalization, inference by analogy, classification, grouping, etc. Theoretical basis of the research was standards in the field of environmental management, regulatory framework for waste management in the Republic of Belarus and countries of the European Space, special foreign and domestic economic literature on environmental protection, environmental management and "green" accounting.

Recently, enterprises are increasingly faced with a serious problem of increasing the amount of waste generated and reducing the space for their disposal. The governments around the world demonstrate the importance of developing strategies aimed to the competent waste management, streamlining their accounting system, as well as taking into account the environmental costs of waste disposal and the restoration of material resources in circular economy. However, research in this area is limited.

The search for solutions to the problems of developing an integrated waste management system and developing methodology for its implementation has been the object of scientific research by foreign and domestic authors. In particular, the following authors considered the issues of waste management in the context of circular economy: M. Bartolomeo [8], R. H. Gray [9], [10], [11], P. Bartelmus, E.K. Seifert [12], A. Tisserant, S.Pauliuk, S. Merciai, J. Schmidt, J. Fry, R. Wood, A. Tukker [13], M.G. Baldarelli, N. Nesheva-Kiosseva [14], K. Uno, P. Bartelmus [15], A. B. Gala [16], J.S. Krones [17], N. Kirboe, H. Sramkova, M. Krarup [18], D. Gallaud, B. Laperche [19], McKinsey [20], R.C. Brears [21], B. Muys [22], Wen-Hong Zhang [23], Si-Yi Qin, Bing Hao [24], Liang Dai [25], Jing-Chi Guo [26], Du C.L. [27], Y. Geng, X.B. Wang, Q.H. Zhu, H.X. Zhao [28], L.H. Hao, H.M. Xie, M. Huang, M.X. Lu, S.B. Yao [29], P. Heck [30], S. Wang [31], K. Parajuly [32], Y.I. Vaisman, O.A. Tagilova, E.L. Sadokhina [33]. The works of these scientists have made a significant contribution to the development of methodological recommendations for waste management, the issues of their recycling, utilization and disposal. Among the issues that are reflected in these works can also be identified: the analysis of historically established approaches to solving waste management problems, the conceptual framework, alternative sources and tools of environmental accounting in the context of circular economy, the experience of various countries in this area, the actions taken to protect the environment and their consequences, as well as tools and reporting standards (ISO, GRI). A lot of attention is paid to environmental safety at macro level and despite the availability of research and development in these areas, there are some unsolved questions on the integration of economic and environmental accounting at micro level.

No less attention is paid to the issue of waste management costs, environmental protection costs arising from the activities of enterprises. Interest in this topic is actively present in the world scientific field since the end of the 20th century and is reflected in the works of the following authors: R.T. Enander [34], M. Dutta [35], William D. Robinson [36], Paul N. Cheremisinoff [37], M.D. Ivanova [38], L.A. Nasakina [39], A.N. Brylev [40], L.V. Chhutiashvili [41], Z.S. Tysyakova, A.A. Chertkova [42], Ch. Jasch [43], Giuseppe D'Onza, Giulio Greco, Marco Allegrini [44], R. Jachnik [45], Kely Cristina Passarini, Maria Aparecida Pereira, Thiago Michel de Brito Farias, Felipe Araújo Calarge, Carlos Curvelo Santana [46]. The purpose of these works was to implement a tool for managing environmental costs - calculating the cost of collecting various types of waste, their recycling and disposal. The problematic issues of the implementation procedures for the formation of environmental costs and their reflection in accounting were thoroughly studied. The analysis of previous studies and research in this area allowed us to conclude that the main lack of modern studies of the specific nature of environmental protection costs is that they focus mainly on the cost component of the main types of activity. The costs of environmental activities in the process of their accounting are distributed both to the finished product and to the balances of the work in progress.

The development and streamlining of the industrial waste accounting system has been studied by Woodard & Curran, Inc. [47], Lawrence K. Wang, Yung-Tse Hung, Howard H. Lo, Constantine Yapijakis [48], D.O.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Gricishen [49], S.I. Pronin [50], E.P. Volynkina [51], N.N. Rubanova [52], M.A. Grosheva [53], R.Z. Umerov [54], O.V. Lapytova [55], M.P. Cheysova [56], V.I. Petukhov, O.L. Litvinec, A.V. Taskin, A.S. Holodov, S.I. Ivannikov [57], E.A. Antanenkova [58], T.M. Panchenko [59]. These studies underscore the negative impact of industrial enterprises on the environment in terms of industrial waste generation. The peculiarities of accounting for industrial wastes and environmental costs associated with their treatment are reflected.

There is no doubt that there are many studies in the field of waste management. However, it is necessary to mention that all studies are quite fragmentary. Part of the research is devoted to general waste issues, for example, environmental management, some consider the issues of waste management in the context of the competent formation of environmental costs and their reflection in the accounts. Proceeding from the set of research results, the authors concluded that there is no development of an integrated accounting system for handling industrial waste that would include general aspects (waste collection, recycling, utilization and disposal), the reflection of industrial waste as objects of accounting and accounting of costs connected with waste treatment. The lack of developments in this issue determines the relevance of the chosen topic.

2. Classification of industrial waste for accounting purposes

The most important prerequisite for the organization of accounting is a scientifically based classification, which makes it advisable to develop classification of industrial waste of petrochemical complex.

According to the Law of the Republic of Belarus "On Waste Management" No. 271-3, wastes are substances or objects formed in the process of carrying out economic activity, human activity and that do not have a specific purpose at the place of their formation, or have lost their consumption properties in whole or in part [60]. In accordance with this Law, waste is divided into types depending on:

1) By origin - production waste and consumption waste
2) By aggregate state - solid and liquid waste;
3) By possibility of their use - secondary material resources and other wastes of production and consumption.

Based on the study of waste classification approaches in the regulatory and legal acts of the Republic of Belarus, five levels of waste classification can be identified as basic and common to all types of waste:

Table 1. The main levels of waste classification for accounting purposes

The level	Classification sign	Type of waste
1	By origin	Production waste; Consumption waste.
2	According to the aggregate state	Solid waste; Liquid waste;
3	By place of origin	Depending on the specific process, where these waste occur: construction, reconstruction, cleaning of reservoirs, etc.
4	By possibility for further use	Secondary material resources; Other waste products of production and consumption.
5	On the need for further processing for use	Used after recycling; Used without recucling.
6	By class and degree hazards	According Decision No. 1391 [61]

Source: authors' own development based on The Law No. 271-3 [60], Decision No. 1391 [61]

At the same time, different kinds of waste will have their own classification peculiarities for accounting purposes, which will be considered further.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

For the purpose of this study, the authors will consider industrial waste, which is the waste produced during the implementation by economic entities (production of products, energy, performance of work, provision of services), by-products and associated products of mining and mineral processing, cause the interest [60].

A number of policy documents regulates activity connected with industrial waste management in the Republic of Belarus. State regulation and management in the field of waste management is carried out by the President of the Republic of Belarus, the Council of Ministers of the Republic of Belarus, as well as the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the Ministry of Housing and Communal Services of the Republic of Belarus, the Ministry of Health of the Republic of Belarus, the Ministry of Emergency Situations of the Republic of Belarus, Ministry of Trade of the Republic of Belarus, Ministry of Finance of the Republic of Belarus, local Councils of Deputies, month executive and administrative bodies, other state bodies within their competence, as defined by law.

Despite the existence of legislative acts and scientific research in the field of waste management in the Republic of Belarus, there are a huge number of controversial issues connected with specificity of various types of waste. Our research is based on accounting practices of organizations of the Vitebsk region in the Republic of Belarus. The Vitebsk region is a highly developed industrial region in Belarus. In 2017, the industry is represented by 1,548 enterprises of various industries, trade - 3,823 enterprises, transport and communications - 1495 enterprises. The production of petroleum products defines the structure of industrial production in the region: in 2017, 50% of the region's industrial output.

As a result of research accounting practice of production waste, the authors has identified three groups of waste, which have a number of controversial issues in assesment, identification and reflecting in the accounts:

1) scrap and waste of ferrous and non-ferrous metals (group of wastes from metals and their alloys);
2) construction waste (group of wood waste, waste of pulp, paper, cardboard, mineral waste (excluding metal waste, waste of plastics, rubber-containing waste));
3) waste arising from cleaning of reservoirs (group of wastes from oil-refined products).

All types listed above of industrial waste are of the interest for this research, since they have their own specific features that will have a significant impact on their accounting system construction.
Let’s consider the classification of industrial waste types mentioned in petrochemical complex for accounting purposes.

Instruction No. 98/12/10 specifies that scrap and waste of ferrous and non-ferrous metals are equipment that has become unusable or has lost its operational value, units and assemblies, products made of ferrous and non-ferrous metals, production waste from ferrous and non-ferrous metals, and also an incorrigible marriage arising in the course of their production [62]. This type of waste includes Group II wastes. “Wastes from metals and their alloys”, presented in Table 2. Depending on metal prevailing in scrap metal, as well as physical characteristics, chemical composition, quality characteristics, carbon content, scrap metal is divided into classes, groups, varieties and species. In accordance with section 4 “Classification and designation” STB 2026-2010, scrap metal is classified according to classes, categories, quality indicators, and the content of alloying elements. The classification of scrap and waste of ferrous and non-ferrous metals is presented below:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Table 2. Proposed classification of scrap and waste of ferrous and non-ferrous metals

Classification sign	Type of scrap and waste of ferrous and non-ferrous metals	
By origin	1. Production waste; 2. Consumption waste.	
According to the aggregate state	1. Solid waste.	
By place of origin	1. Liquidation; 2. Repair and maintenance; 3. Reconstruction, modernization, restoration; 4. Installation, dismantling; 5. The main production process; 6. Other auxiliary and service production.	
By possibility for further use	1. Secondary material resources.	
By degree hazards	1. Hazardous; 2. Not hazardous.	
By composition	1. Waste of ferrous and non-ferrous metals, separated clean; 2. Waste of non-ferrous metals (cable products); 3. Waste of ferrous and non-ferrous metals in combination products.	
By class	Carbon content	Steel scrap
		Scrap iron
By category	By the presence of alloying elements	Carbon scrap (designated by the letter A)
		Scrap metal alloy (denoted by the letter B)
By species	According to the characteristics and quality indicators. (denoted by letters)	K - scrap metal with increased quality indicators in terms of dimensions and characteristics
		M - scrap metal with increased clogging
		H - scrap metal and (or) unsorted
		C - scrap metal with reduced quality indicators in terms of dimensions and characteristics
		SR - scrap metal (shredded)

Source: authors' own development based on STB 2026-2010. Secondary black metals. General specifications [63]

The second group of industrial waste in petrochemical complex is construction waste. Construction waste is waste, generated during the implementation of economic activities by legal entities and individual entrepreneurs for the erection, reconstruction, capital and current repair, restoration, improvement, installation, dismantling and demolition of buildings and structures, industrial objects, roads, engineering and other communications, including the implementation of organizational and technical measures, special, installation and commissioning [64]. Based on the study of normative and legal acts of the Republic of Belarus regulating waste management, as well as the instruction on waste management of petrochemical enterprise, the authors present the classification of construction waste:

Table 3. Proposed classification of construction waste

Classification sign	Type of construction waste
By origin	1. Production waste; 2. Consumption waste.
According to the aggregate state	1. Solid waste; 2. Liquid waste.
By place of origin	1. Construction site; 2. The site of production of construction, installation, repair and other works.
By type of work performed	1. Liquidation; 2. Repair and maintenance; 3. Reconstruction, modernization, restoration;

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Classification sign	Type of construction waste	
	4. Installation, dismantling; 5. The main production process; 6. Other auxiliary and service production.	
By possibility for further use	1. Secondary material resources.	2. Other waste (without the possibility of further use).
	1.1. To be used and/or neutralized	2.1 To be disposed (placing in storage tanks, landfills)
On the need for further processing for use (crushing, sorting, stratification, etc.)	1. Waste to be processed for further use; 2. Waste not to be processed for further use.	
By directions of possible use	1. Waste for production; 2. Waste for energy; 3. Waste to perform work, provide services.	
By class and degree hazards	Hazard class 3-4, non-hazardous	

Source: authors' own development based on The Law No. 271-3 [60], Decision No. 1391 [61], TCP 17.11-10-2014 [64], Resolution No. 85 [65], The Instruction on Waste Management [66]

Next, let's consider the classification of waste arising from cleaning of reservoirs. The organizations' activity in petrochemical complex lead to the formation of waste arising from the cleaning of reservoirs and tanks. Based on the study of existing classification approaches and based on the technology for extracting residual oil products from the cleaning products and their involvement in processing, taking into account the specifics and conceptual features of the received wastes and losses during the cleaning of reservoirs, the authors propose the following classification of such objects:

Table 4. Proposed classification of waste arising from cleaning of reservoirs

Classification sign	Type of construction waste arising from cleaning of reservoirs	
By origin	1. Industrial waste.	
According to the aggregate state	1. Solid waste; 2. Liquid waste.	
By place of origin	As a result of stripping tanks, tanks.	
By the stage of the technological process	1. Cleaning reservoir, i.e., physically separating process residue for further storage in an intermediate tank;	Technological residue;
	2. Temporary storage of the technological residue in cutting reservoir before accumulation of sufficient volume for processing;	
	3. Recycling of technological residue;	1. Secondary raw materials, i.e. potable product (oil products suitable for use); 2. Irreversible waste (inorganic part - rust, silt, sand); 3. Water.
	4. Disposal (burial).	Irreversible waste (inorganic part - rust, silt, sand).
On the need for further processing for use	1. Waste to be processed for further use (Technological residue); 2. Waste not to be processed for further use (Inorganic Part).	
By possibility for further use	1. Secondary material resources; 2. Other waste (without the possibility of further use).	
By directions of possible use	1. When carrying out the main activities in the main production (Organic - paraffin, asphalt, tar, etc.) containing high-molecular hydrocarbons) 2. Not possible to use: Bottom sediment (sludge) (non-return waste (inorganic part - rust, silt, sand).	
By class hazards	Hazard class 3-4	
By degree hazards	1. Moderately hazardous; 2. Low hazardous.	

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Source: authors' own development based on the Law No. 271-3 [60], Decision No. 1391 [61], Resolution No. 85 [65], The Instruction on Waste Management [66], Order No. 99 [67]

3. Identification of accounting objects at technological cycle stages of industrial waste

As practice has shown, one of the most complicated moments of waste management accounting is a long period of time from the moment of waste generation up to the moment of their use. Especially in those cases, when additional processing/recycling and changing the material form are required. In this connection, it is necessary to identify the objects of accounting at technological cycle stages of industrial waste.

The category "technological cycle stages of waste" was involved into the domestic practice of waste management with the interstate standard GOST 30773-2001 "Resource Saving. Waste management. Technological cycle Stages", adopted by the Interstate Council for Standardization, Metrology and Certification (Minutes No. 19 of May 24, 2001). The state standards committees of such countries as the Republic of Belarus, the Russian Federation, Ukraine, Azerbaijan, Armenia, Kazakhstan, Moldova, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, and the Republic of Uzbekistan supported this standard. The standard corresponds to the OECD Resolution on Transboundary Movements of Hazardous Wastes for Regeneration Operations with (92) 39 (adopted by the Council on 30 March 1992), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (22 March 1989) [68]. Technological cycle stages of waste are also detailed in the series of international standards ISO 14000 "Environmental Management" [69].

According to GOST 30773-2001, the process of industrial waste generation is considered in relation to the life cycle of products, which is "a set of interrelated processes of successive changes in the state of the product from the beginning of the study and justification of its development until the end of the service life". An appropriate type of waste can be generated at each stage of the product life cycle (Research and development rationale, development, production, operation (including decommissioning, decommissioning, transfer, disposal, destruction) and major repairs). In this case, technological cycle stages of waste from a particular facility begin at the stage of liquidation after the object has been decommissioned.

Technological cycle stage of waste is the sequence of processes for handling specific wastes during the period from their appearance (at the stages of the product life cycle), certification, collection, sorting, transportation, storage (storage), including disposal and / or disposal (disposal) the end of their existence. Separation of technological cycle stages of industrial waste is important not only for organizing the correct waste management process, but also for identifying accounting objects at these stages, since each of them has its own specificity. In general, there are nine stages of the technological cycle of waste, which are presented below:

Table 5. Technological cycle stages of waste according to GOST 30773-2001

Name of the stage	Content of the stage
1. Emergence	The emergence of waste takes place in technological and operational processes, as well as from objects liquidation.
2. Collection and Accumulation	Collection and/or accumulation of objects and wastes in designated locations should be carried out on the territory of the owner or other authorized territory.
3. Identification	Identification of objects and wastes can be visual and/or instrumental in terms of the characteristics, parameters, indicators and requirements necessary to confirm the compliance of a particular facility or to a description of it.
4. Sorting (with neutralization)	Separation and/or mixing of waste according to certain criteria into qualitatively different components. If necessary, work is carried out on the primary neutralization of objects and waste.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Name of the stage	Content of the stage
5. Certification	When the objects and waste are certified, passports are filled in and catalog descriptions are registered in accordance with the adopted forms in national standards bodies.
6. Packaging (and labeling)	Packing of objects and waste is to ensure the integrity and safety of objects and waste in the course of sorting, loading, transportation, storage, storage in designated locations by means of installed methods and means (by stacking in containers or other containers, by packaging, by briquetting with appropriate marking) . Particular attention should be paid to packaging and labeling of hazardous objects and wastes
7. Transportation and storage	Transportation and warehousing of objects and waste should be in established (authorized) places.
8. Storage	Storage of objects and waste should be open, under a canopy, in containers, mines and other sanctioned places.
9. Disposal	The removal of objects and waste is carried out by recycling (reuse) or disposal (destruction). The first sub-step of the 9th stage is the utilization of objects and waste. On the sub-stage of recycling, recycling of defective or obsolete products, their constituent parts and wastes from them by dismantling (disaggregation), remelting, using other technologies with recycling (recovery) of organic and inorganic constituents, metals and metal compounds for reuse in national economy, as well as with the elimination of waste generated again. The second sub-step of the 9th stage of the technological cycle for the elimination of hazardous wastes and other wastes is their safe disposal at appropriate landfills or destruction if the disposal of waste threatens the health and lives of people and the environment.

Source: authors' own development based on GOST 30773-2001 [68]

Technological cycle of waste cannot be the same for all types of waste and implies a sequence of technological processes for the elimination of specific waste. In this regard, not every type of industrial waste passes through all nine stages of the technological cycle, for different waste, some stages can occur simultaneously, and some even do not exist. Thus, waste transportation can occur both at the collection and accumulation stage (stage 2) and at the stage 7 - transportation and storage. Neutralization can be, both at stage 1 and at stage 3. Stage 5: certification in accordance with the legislation of the Republic of Belarus is carried out only in the transport of waste - the movement of waste vehicles, carried out on a contractual basis or on other legal grounds [68]. Stage 7-transportation and storage, may be absent altogether. Stage 9 - removal, it is advisable to divide into separate stages: use (for recycling waste) and disposal (destruction) (for non-return). Thus, following the requirements of GOST 30773-2001, the Law No. 371-з and the practice of waste management in the Republic of Belarus, the following enlarged of technological cycle stages of industrial waste of petrochemical complex that significantly affect the system of their accounting:

Table 6. Proposed intergrated technological cycle stages of industrial waste

Name of the stage	Contents of the stage	Definition
Stage 1: Emergence	1) Simultaneously with identification 2) In some cases simultaneously with disinfection	Identification of waste: activities related to the determination of the belonging of a given object to a waste of one or another type, accompanied by the establishment of data on its hazardous, resource, technological and other characteristics. Identification includes classification and coding of waste.
Stage 2: Collection and Accumulation	In some cases simultaneously with disinfection	Activities on the concentration of waste in places of temporary storage of waste for the purpose of their subsequent disposal
Stage 3: Waste Preparation for Use	Includes sorting, packaging, labeling, stratification, etc.	A set of technological operations performed with waste to ensure the subsequent use of waste as a secondary raw material
Stage 4:Storage	It is carried out for the purpose of further use for recycling waste and disposal (destruction) for waste that are impossible to use.	Waste content in places of temporary storage of waste, at waste storage facilities prior to their transportation to burial sites, disposal of waste and (or) waste disposal facilities
Stage 5:Using	1) in own production process 2) sale on the side 3) gratuitous transfer, etc.	The use of waste products for the production of products, energy, works, services

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Stage 6: Burial (destruction/disposal)	1) Including transportation / transportation of waste 2) including certification (if there is transportation / transportation of waste	Waste insulation at waste disposal sites in order to prevent the harmful impact of waste products of their interaction and (or) decomposition on the environment, health of citizens, property owned by the state, property of legal entities and individuals (hereinafter - property), not providing for the possibility of their further use

Source: authors' own development based on The Law No. 271-З [60], GOST 30773-2001 [68]

Accounting objects will arise at each stage of the technological cycle of waste. Accounting objects of industrial waste of petrochemical complex in conditions of application of ecological technologies of their utilization and processing taking into account branch features are:

1) Returnable waste, as it can bring economic benefits to organization in the future, which meets the criteria for recognizing assets, according to The Law "On Accounting and Reporting" [70]. In this case, returnable waste in the context of technological cycle stages is the result of the processes occurring at the relevant stage (ie, the product of the output stage). Recycling waste, according to the order of the Ministry of Industry of the Republic of Belarus of June 5, 2015 No. 273 "On approval of the Methodological recommendations for forecasting, accounting and calculation of the cost of production (goods, works, services) in industrial organizations of the system of the Ministry of Industry of the Republic of Belarus", for their recognition must meet the following criteria:

- presence of material form;
- change (loss) of properties of the original raw materials;
- education in the process of production, performance of work, provision of services;
- further use in the production process (main or auxiliary) with increased costs (reduced yield) or use not for its intended purpose [71].

The remains of material resources, which according to the established technology are transferred to other shops, divisions as a high-grade material for the production of other types of products (works, services) do not belong to recyclable waste.

2) The costs associated with the implementation of a set of measures for the use or disposal of industrial wastes, due to the specifics of each technological cycle stage of waste. It is important to note that such costs arise from the second stage of the technological cycle of the waste. In spite of the fact that waste will be recognized as accounting objects only if the criteria for recognition of assets are fulfilled, irrevocable wastes will not be the object of accounting, since they do not have the ability to bring economic benefits to the organization in the future. However, the costs arising from their disposal will not only be the object of accounting, but also depend on the amount and type of such irretrievable waste. In this regard, it is necessary to keep a rapid accounting of irrecoverable waste in quantitative terms. In the interests of this study, the authors will consider the features of identification of industrial wastes as accounting objects at the allocated integrated stages of the technological cycle in the context of the following types of industrial waste:

1) Scrap and waste of ferrous and non-ferrous metals;
2) Construction waste;
3) Waste arising from cleaning of reservoirs.

1) Scrap and waste of ferrous and non-ferrous metals

According to Article 25 of The Law No. 271-З, burial of secondary material resources is prohibited.

Therefore, Stage 6 "Burial" in waste management of ferrous and non-ferrous metals will be absent.

The complexity of identifying the objects of accounting for waste of ferrous and non-ferrous metals at the previously mentioned stages, and their registration is because the metals themselves:

- can not always be separated from each other;
- can not always be separated from other materials;
- can not always be distinguished from the composition of the combined product.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

In this regard, the authors consider waste of ferrous and non-ferrous metals in the following order:

a) Waste of ferrous and non-ferrous metals, separated clean;
b) Waste of non-ferrous metals (cable products);
c) Waste of ferrous and non-ferrous metals in combination products.

a) Waste of ferrous and non-ferrous metals, separated clean

At the stage of appearance, the following wastes arise:

- Steel scrap unsorted,
- Cast iron scrap unsorted;
- Alloys of alloy steel in lumpy form are uncontaminated;
- Other scrap and waste of ferrous metals not included in group II A incl. shaving metal, etc.

Wastes of ferrous and non-ferrous metals, separable clean pass through the following stages: Stage 1, Stage 2, Stage 3 and Stage 4. The resulting waste during all stages of the technological cycle does not change its material-material form.

b) Waste of non-ferrous metals (cable products)

Separate attention deserves a scrap of cables, because in their composition, in addition to the metal, there are other materials (plastic, fabric and other metals).

Among the types of waste generated, the following can be identified:

- Cable with aluminum conductors in insulation;
- Cable with copper conductors in isolation.

Waste of ferrous and non-ferrous metals containing foreign material passes through stage 1, stage 2, stage 3 and stage 4. During the use stage, these types of waste change the material-material form.

c) Waste of ferrous and non-ferrous metals in combination products

The division of the combination products into specific components is not possible or economically uneffective. As a part of the combination products, there can be both metals of different types, and other materials (plastic, fabric and other metals). Some types of waste ferrous and non-ferrous metals belong to the class of difficult-to-dismember (combination) products, when they contain black metal with impurities of non-ferrous metal: copper, brass, bronze, aluminum, etc. Such wastes include: lead accumulators spent intact with not discharged electrolyte, scrap of electric motors and scrap of heat exchanger tubes. Waste of ferrous and non-ferrous metals in the combined products pass through stage 1, stage 2, stage 3 and stage 4. The material form of the generated waste changes during the use phase. For example, scrap engine has a composition of copper. When the electric motor is handed over to the metal acceptance organization, they accept two kinds of metal (cast iron and copper).

2) Contruction waste

Not every type of construction waste passes through all the intergrated stages of technological cycle. This is because construction waste can be both suitable and not suitable for future use. Construction waste for further use may not always be involved in the production process immediately after the collection and/or accumulation stage. Some types of construction waste require processing. During processing, construction waste can change its material-material form, its quantitative and qualitative indicators, which will undoubtedly affect the system of their accounting.

In the practice of the organizations studied, the following groups of construction waste are formed:

- Wood waste;
- Waste pulp, paper, cardboard;
- Waste of mineral origin (excluding metal waste);
- Other wastes of mineral origin, including waste products for refining;
- Waste plastic, rubber-containing waste.

For each indicated group of construction waste, there are specific features of their passage of these stages of the technological cycle of construction waste. Considering these features, we will consider the selected types of construction waste in the context of technological cycle stages, presented in Table 7:

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Table 7. Construction waste at the stages of the technological cycle of industrial waste

Emerging construction waste	Construction waste groups	Construction waste types	Technological cycle stages
Construction waste to be processed for further use	Waste of mineral origin (excluding metal waste)	Scrap/bout of concrete, expanded clay, reinforced concrete and brick	Stage 1: Emergence; Stage 2: Collection and Accumulation; Stage 3: Waste Preparation for Use; Stage 4: Storage; Stage 5: Using.
Construction waste not to be processed for further use	Wood waste	Sawdust and chips in the manufacture of carpentry and milled products, wood waste construction, products made of natural wood, lost their consumer properties and other	Stage 1: Emergence; Stage 2: Collection and Accumulation; Stage 4: Storage; Stage 5: Using.
	Waste pulp, paper, cardboard	Ruberoid waste and paper and cardboard filters impregnated with petroleum products	
	Waste plastic, rubber-containing waste	Polyethylene	
Construction waste to be disposed (placing in storage tanks, landfills)	Wood waste	Contaminated wood waste	Stage 1: Emergence; Stage 2: Collection and Accumulation; Stage 4: Storage; Stage 6: Burial (destruction/disposal). A shorter technological cycle is also possible for these types of waste: Stage 1: Emergence; Stage 6: Burial (destruction/disposal).
	Waste pulp, paper, cardboard	Paper and cardboard filters impregnated with petroleum products	
	Waste of mineral origin (excluding metal waste)	Glass-reinforced glass; Fiberglass fouled; Waste glass "Triplex"; Sand contaminated with inorganic substances (acids, alkalis, salts, etc.); Waste of dry cleaning of garages, car parks, parking places of transport; Waste products of heat-insulating asbestos-containing products; Sludge of gas cleaning	
	Other wastes of mineral origin, including waste products for refining	Combined construction waste, construction waste from building luquidation	
	Waste plastic, rubber-containing waste	Waste glass wool, Wiping material contaminated with oils (oil content 15% and more), Waste of paronite Waste ion exchange resins; Fluoroplastic; Waste of pipes, hoses of vulcanized rubber	
Mixed construction waste	Types of construction waste that are subject to further use, during the processing of which not only new types of construction waste will be generated (for use), but also waste that is to be buried - no petrochemical complex is formed		Stage 1: Emergence; Stage 2: Collection and Accumulation; Stage 3: Waste Preparation for Use; Stage 4: Storage; Stage 5: Using; Stage 6: Burial (destruction/disposal).

Source: authors' own development
[72]

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

3) Waste arising from cleaning of reservoirs

Among the technological process stages of reservoirs cleaning, extracting residual oil products from the equipment cleaning products and involving them into processing, the following can be singled out:

Stage 1: Emergence (cleaning reservoirs, i.e., physically separating process residue for further storage in an intermediate tank);

Stage 2: Collection and Accumulation (Temporary storage of technological residue in cutting reservoir before accumulation of sufficient volume for processing);

Stage 3: Waste Preparation for Use (Recycling of technological residue, extraction of oil products from cleaning products and their involvement in processing);

Stage 5: Using (in terms of involvement in oil residues processing);

Stage 6: Burial (disposal of waste not possible for further use).

At stage 1, technological residue will be the object in waste accounting, which then goes to step 2, where it is placed in the separation reservoir for further collection and temporary storage in order to accumulate sufficient volume for subsequent processing.

At stage 1, the following accounting items are determined:

- Liquefied residue;
- Technological residue.

It should be noted that the received "liquefied residue" being the object of accounting is not a waste, since it is a full-fledged oil product and is used for its intended purpose.

Technological residue obtained as a result of cleaning reservoir is also subject for accounting.

At stage 3 "Waste Preparation for Use" through the separation and subsequent decontamination, the following accounting objects are formed:

1. Recyclable raw materials used:

Secondary raw materials, i.e. potable product (oil products suitable for use);

2. Non-returnable waste (technological losses), subject to disposal, so-called bottom sediments, sludges) - inorganic part (rust, silt, sand, etc.).

In this case, recyclable waste used will be transferred to stage 4 "Use", and irretrievable waste to stage 5 "Burial (destruction/disposal)".

The results of the research will be presented in the table in the context of accounting objects arising at technological cycle stages of petrochemical complex industrial waste:

Table 8. Identification of accounting objects at technological cycle stages of industrial waste

Technological cycle stages	Accounting objects	
	Waste	Costs
SCRAP AND WASTE OF FERROUS AND NON-FERROUS METALS		
Waste of ferrous and non-ferrous metals, separated clean		
Emergence	Steel scrap unsorted; Scrap iron cast unsorted; Other scrap and waste of ferrous metals not included in group II A; Aluminum scrap unsorted; Copper alloy scrap unsorted; Bronze scrap unsorted; Scrap of brass unsorted; Scrap and lead wastes (without lead accumulators)	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Waste Preparation for Use		Waste preparation costs for use
Storage		Storage costs
Using		Costs of use
Waste of non-ferrous metals (cable products)		
Emergence	Scrap of cable products; Leaded cable and wires with copper conductors in polyethylene, polystyrene and rubber insulation; Leaded cable and wires with aluminum conductors in paper insulation; Cable with aluminum sheath and copper core	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Waste Preparation for Use		Waste preparation costs for use
Storage		Storage costs
Using		Costs of use

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Technological cycle stages	Accounting objects	
	Waste	Costs
Waste of ferrous and non-ferrous metals in combination products		
Emergence	Mercury spent thermometers; Mercury lamps used; Luminescent tubes used; Compact fluorescent lamps (energy-saving) used; Lead accumulators used intact with not drained electrolyte; Scrap of electric motors	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Waste Preparation for Use		Waste preparation costs for use
Storage		Storage costs
Using	Waste of ferrous and non-ferrous metals by types	Costs of use
CONSTRUCTION WASTE		
Construction waste to be processed for further use		
Emergence	*Waste of mineral origin (excluding metal waste)*: scrap/bout of concrete, expanded clay, reinforced concrete and brick	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Waste Preparation for Use	A new type of waste after recycling: crushed stone of various fractions, brick crumb, etc.	Waste preparation costs for use
Storage		Storage costs
Using		Costs of use
Construction waste not to be processed for further use		
Emergence	*Different types of wood waste, waste pulp, paper, cardboard, waste plastic, rubber-containing waste*	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Waste Preparation for Use		Waste preparation costs for use
Storage		Storage costs
Using		Costs of use
Construction waste to be disposed (placing in storage tanks, landfills)		
Emergence	Contaminated wood waste, paper and cardboard filters impregnated with petroleum products, glass-reinforced glass; fiberglass fouled; waste glass "triplex"; sand contaminated with inorganic substances (acids, alkalis, salts, etc.); waste of dry cleaning of garages, car parks, parking places of transport; waste products of heat-insulating asbestos-containing products; sludge of gas cleaning, combined construction waste, construction waste from building luquidation, waste glass wool, wiping material contaminated with oils (oil content 15% and more), waste of paronite waste ion exchange resins; fluoroplastic; waste of pipes, hoses of vulcanized rubber	Costs for work performed
Collection and Accumulation		Costs for collection and accumulation
Storage		Storage costs
Burial (destruction/disposal)		Burial (destruction/disposal) costs
WASTE ARISING FROM CLEANING OF RESERVOIRS		
Emergence	Technological residue	A) Costs of preparatory work B) Costs for cleaning C) Waste material disposal costs
Collection and Accumulation	Replenished technological residue	A) Costs of preparatory work B) Costs for stripping C) Waste material disposal costs D) Costs related to storage losses E) Taxes and fees F) Storage costs
Waste Preparation for Use	Returnable raw materials	A) Costs for cleaning separation reservoir and separation of technological residue
Using	Recyclable waste: - Entrapped product; - Wash water with subsequent use.	A) Additional costs for re-engaging in turnover B) Transferring water to treatment facilities costs
Burial (destruction/disposal)	Irreversible waste to be disposed of (**bottom sediments, sludges**) - inorganic part (rust, silt, sand, etc.)	A) Waste transportation costs B) Storage costs

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Source: authors' own development based on The Law No. 271-3 [60], Decision No. 1391 [61], Resolution No. 85 [65], The Instruction on Waste Management [66], GOST 30773-2001 [68]

Conclusions

Thus, during the conducted research the following tasks were solved:

1. The generalized classification of industrial waste for accounting purposes was presented, and approaches for the classification of certain types of waste were developed: scrap and waste of ferrous and non-ferrous metals, construction waste and waste arising from cleaning of reservoirs;
2. The integrated technological cycle stages of industrial waste were singled out, as well as the features of the separation of these stages in the context of waste types;
3. The authors scientifically substantiated the approaches to identification of accounting objects arising at technological cycle stages: waste and costs, also accounting objects at recycling technological cycle stages of various types of waste were identified: scrap and waste of ferrous and non-ferrous metals, construction waste and waste arising from cleaning of reservoirs.

In future, the results of the research will let the authors develop practical recommendations for industrial waste assessment and accounting for the circular economy purposes.

References

1. Report of the Secretary-General of United Nations, 2017. "Progress towards the Sustainable Development Goals". High-level political forum on sustainable development, convened under the auspices of the Economic and Social Council: Economic and environmental questions: Sustainable development. July 27-28, Retrieved from https://sustainabledevelopment.un.org/sdg12

2. Ellen MacArthur Foundation, 2015 *Delivering the Circular Economy a Toolkit for Policymakers.* Retrieved from https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_PolicymakerToolkit.pdf

3. Pahomova, N.V. & Rihter, K.K. & Vetrova M.A. 2017. Transition to the circular economy and the closed chain of supply as a factor for sustainable development, *Bulletin of St. Petersburg State University. Economy. 33(2): 244-268*

4. Makela, T. 2017. Curcular Economy. *World Forum of Cyclic Economics (WCEF2017)*. June 5-7, Helsinki, Finland, Retrieved from https://frontnews.eu/news/ru/3211

5. Decree No. 1061, which approved the National Action Plan for the Development of the Green Economy in the Republic of Belarus

6. Zamyla, I.B. 2010. Accounting of environmental activity in ensuring sustainable development of the economy. Zhytomyr, Zhytomyr region: Zhytomyr State Technological University

7. Malysheva, M. S. 2013. Organization, the Main Directions and Objectives of Economic Analysis Environmental Performance, *Contemporary Economic Issues* 4. https://doi.org/10.24194/41301

8. Bartolomeo, M. 2000. Environmental management accounting in Europe: current practice and future potential, *European Accounting Review*, Vol. 9: pp. 31-52

9. Gray, R. 1993. Accounting for the Environment and Sustainability in Lesser Developed Countries: an explanatory note, *Research in Third World Accounting*, Vol.2: pp. 387-399

10. Gray, R.H. 2000. Environmental accounting, managerialism and sustainability: is the planet safe in the hands of business and accounting, *Advances in Environmental Accounting and Management*, Vol.1: pp. 1-44

11. Gray, R. 1997. Green accounting: cosmetic irrelevance or radical agenda for change, *Asia-Pacific Journal of Accounting*, Vol.4: pp.175-198

12. Bartelmus, P., Seifert E.K. 2018. *Green accounting*. Retrieved from https://books.google.by/books?id=cepGDwAAQBAJ&pg=PT305&dq=industrial+waste+accounting&hl=ru&sa=X&ved=0ahUKEwjfxuLo29raAhVHzKQKHcV8BlM4FBDoAQhKMAU#v=onepage&q=industrial%20waste%20accounting&f=false

13. Tisserant, A., Pauliuk, S., Merciai, S., Schmidt, J., Fry, J., Wood, R., Tukker, A. 2017. *Solid Waste and the Circular Economy*. Retrieved from http://folk.ntnu.no/richardw/papers/Tisserant%20et%20al._2017_Journal%20of%20Industrial%20Ecology_Solid%20Waste%20and%20the%20Circular%20Economy%20A%20Global%20Analysis%20of%20Waste%20Treatment%20and%20Waste.pdf

14. Baldarelli, M.G., Nesheva-Kiosseva, N. 2017. *Environmental Accounting and reporting*. Retrieved from https://books.google.by/books?id=3tefDgAAQBAJ&pg=PA390&dq=industrial+waste+accounting&hl=ru&sa=X&ved=0ahUKEwiJvsDa29raAhVJ6KQKHS1_DZo4ChDoAQhuMAk#v=onepage&q=industrial%20waste%20accounting&f=false

15. Uno, K., Bartelmus, P. 1998. *Environmental accounting in theory and practice*. Retrieved from https://books.google.by/books?id=FpnpCAAAQBAJ&pg=PA68&dq=industrial+waste+accounting&hl=ru&sa=X&ved=0ahUKEwjewuS229raAhWNyqQKHTbQCxkQ6AEIbDAJ#v=onepage&q=industrial%20waste%20accounting&f=false

16. Gala, A.B. 2015. *Methodological advacenents in LCA of waste management systems*. Retrieved from http://www.tdx.cat/bitstream/handle/10803/289634/abg1de1.pdf?sequence=1

17. Krones, J.S. 2016. *Accounting for Non-Hazardous Industrial Waste in the United States*. Retrieved from https://dspace.mit.edu/bitstream/handle/1721.1/106591/963240167-MIT.pdf?sequence=1

18. Kirboe, N., Sramkova, H., Krarup, M. 2015. *Moving towards a circular economy*. Retrieved from https://books.google.by/books?id=m8GPCgAAQBAJ&printsec=frontcover&dq=circular+economy&hl=ru&sa=X&ved=0ahUKEwj8l7firtzaAhXHb1AKHbvJD90Q6AEIPTAD#v=onepage&q=circular%20economy&f=false

19. Gallaud, D., Laperche, B. 2016. *Circular Economy. Industrial ecology and short supply chain*. Retrieved from https://books.google.by/books?id=LbllDAAAQBAJ&printsec=frontcover&dq=circular+economy&hl=ru&sa=X&ved=0ahUKEwj8l7firtzaAhXHb1AKHbvJD90Q6AEIRDAE#v=onepage&q=circular%20economy&f=false

20. McKinsey&Company. 2012. *Towards the Circular Economy*. Retrieved from https://books.google.by/books?id=fYREngEACAAJ&dq=circular+economy&hl=ru&sa=X&ved=0ahUKEwj8l7firtzaAhXHb1AKHbvJD90Q6AEITTAF

21. Brears, R.C. 2018. *Natural resource management and the circular economy*. Retrieved from https://books.google.by/books?id=SphMDwAAQBAJ&printsec=frontcover&dq=circular+economy&hl=ru&sa=X&ved=0ahUKEwjbr_6OsNzaAhWQYVAKHTFEBqU4ChDoAQglMAA#v=onepage&q=circular%20economy&f=false

22. Muys, B. 1997. *Cleaner production: a guide to information sources*. Retrieved from http://www.eea.dk/projects/envwin/manconc/cleanprd/i_2.htm.1997

23. Wen-Hong Zhang. 2005. Eco-industry, circular economy and sustainable development, *Journal of Southeast University (Philisophy and Social Science)*, Vol.7: pp.59-62

24. Si-Yi Qin, Bing Hao. 2008. Research on the mechanism of circular economy toward environmental protection-sustainable development, *Ecological Economy*, No. 7: pp. 105-109

25. Liang Dai. 2009. Recycling economy and environmental safety, *Renewable Resources and Recycling Economy*, Vol.2: pp.29-31

26. Jing-Chi Guo. 2008. The development of circular economy on the promoting function of employment-an example offushun mining group, *Coal Economic Research*, No. 7: pp. 17-18

27. Du, C.L. 2009. Research on the E-waste Circular Industry in China, *Resources Science* I: pp.13-17

28. Geng, Y., Wang, X.B., Zhu, Q.H., Zhao, H.X. 2010. Towards a National Circular Economy Indicator System in China: An evaluation and Critical Analysis, *Journal of Cleaner Production*, No. 23: pp. 216-224

29. Hao, L.H., Xie, H.M., Huang, M., Lu, M.X., Yao S.B. 2009. Implementing China's Circular economy Concept at the Regional Level: A Review of Progress in Dalian, China, *Waste Management*, No. 29: pp. 996-1002

30. Heck, P. 2006. On the Index System of Cities' Sustainable Development Based on the Circular Economy, *Reformation and Strategy*, No. 25(9): pp.97-101

31. S. Wang. 2009. Learning Necessity of Setting up a Circular Economy from Chinese Pollution Control Data, *Pollution Control*, No. 10: pp. 26-29

32. Parajuly, K. 2017. *Circular Economy in E-waste Management: Resource Recovery and Design for End-of-Life*. Retrieved from https://books.google.by/books?id=Ys2XtAEACAAJ&dq=circular+economy&hl=ru&sa=X&ved=0ahUKEwi_6MLhsNzaAhXGL1AKHaSUDQc4HhDoAQhhMAk

33. Vaisman, Y.I., Tagilova, O.A., Sadokhina, E.L. 2013. Development of Methodological Principles of Creation and Optimization of Waste Traffic Account for the Purpose of Increasing its Environmental, Economic and Social Management. *Ecology and Industry of Russia*, Vol. 12: pp. 40-45

34. Enander, R.T. 1996. *Hazardous Waste Tracking and Cost Accounting Practice.* Retrieved from https://books.google.by/books?id=y2dnrEnqfIEC&pg=PA122&dq=waste+cost+accounting&hl=ru&sa=X&ved=0ahUKEwjq47erw9zaAhWOaFAKHWhEAzQQ6AEIOzAD#v=onepage&q=waste%20cost%20accounting&f=false

35. Dutta, M. 2004. *Cost Accounting: Principles And Practice.* Retrieved from https://books.google.by/books?id=SDtixc4LFHcC&pg=SA2-PA34&dq=waste+cost+accounting&hl=ru&sa=X&ved=0ahUKEwjq47erw9zaAhWOaFAKHWhEAzQQ6AEIQjAE#v=onepage&q=waste%20cost%20accounting&f=false

36. Robinson, W.D. 1986. *The Solid Waste Handbook: A Practical Guide*. Retrieved from https://books.google.by/books?id=a4GE5hR7UjYC&pg=PA179&dq=waste+cost+accounting&hl=ru&sa=X&ved=0ahUKEwjq47erw9zaAhWOaFAKHWhEAzQQ6AEIWjAH#v=onepage&q=waste%20cost%20accounting&f=false

37. Cheremisinoff, P.N. 1995. *Waste minimization and cost reduction for the process industries*. Retrieved from https://books.google.by/books?id=eywV4fkhTHcC&pg=PA1&dq=waste+cost&hl=ru&sa=X&ved=0ahUKEwiF_4rctdzaAhXHbVAKHR7uB3AQ6AEISTAF#v=onepage&q=waste%20cost&f=false

38. Ivanova, M.D. 2005. *Accounting of costs for environmental activities.* Retrieved from http://www.dissercat.com/content/bukhgalterskii-uchet-zatrat-na-prirodookhrannuyu-deyatelnost

39. Nasakina, L.A. 1999. *Features of accounting of costs for environmental protection activities at chemical industry enterprises.* Retrieved from http://www.dissercat.com/content/osobennosti-bukhgalterskogo-ucheta-zatrat-na-prirodookhrannuyu-deyatelnost-na-predpriyatiyak

40. Brylev, A.N. 1983. *Ways to improve the accounting and analysis of the costs of environmental protection in manufacturing enterprises (associations) (for example, the chemical industry)*. Retrieved from http://www.dissercat.com/content/puti-sovershenstvovaniya-ucheta-i-analiza-zatrat-na-okhranu-okruzhayushchei-sredy-v-proizvod

41. Chhutiashvili, L.V. 2010. Issues of accounting and analysis of costs for environmental measures, *International accounting* 12(144): 8-30. https://cyberleninka.ru/article/v/voprosy-buhgalterskogo-ucheta-i-analiza-zatrat-na-prirodoohrannye-meropriyatiya

42. Tysyakova, Z.S., Chertkova, A.A. 2009. Classification of environmental costs in modern accounting, *Вестник ОГУ* 8(102): 111-116. https://cyberleninka.ru/article/n/klassifikatsiya-ekologicheskih-zatrat-v-sovremennom-buhgalterskom-uchete

43. Jasch, Ch. 2009. Environmental and material flow cost accounting. Retrieved from https://books.google.by/books?id=se6TreyGSyUC&pg=PA47&dq=waste+cost+accounting&hl=ru&sa=X&ved=0ahUKEwi5p-ewutzaAhWKLVAKHTqvD6kQ6AEIYDAI#v=onepage&q=waste%20cost%20accounting&f=false

44. D'Onza, G., Greco, G., Allegrini, M. 2016. Full Cost Accounting in the Analysis of Separated Waste Collection Efficiency: A Methodological Proposal. Retrieved from https://books.google.by/books?id=lsAstAEACAAJ&dq=waste+cost+accounting&hl=ru&sa=X&ved=0ahUKEwj2t7q8utzaAhVKaFAKHfnOBFo4ChDoAQg5MAM

45. Jachnik, R. 2006. Assessing the practical relevancy of environmental cost accounting for industrial waste Waste accounting, process efficiency and cleaner production. Retrieved from https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1329403&fileOId=1329404

46. Passarini, K.C., Pereira, M.A., Farias, T.M. de B., Calarge, F.A., Santana, C.C. 2014. Assessment of the viability and sustainability of an integrated waste management system for the city of Campinas (Brazil), by means of ecological cost accounting, *Journal of Cleaner Production*, Vol. 65: pp. 479-488

47. Woodard & Curran, Inc. 2006. Industrial Waste Treatment Handbook. Retrieved from https://books.google.by/books?id=H1CAb3Nx35wC&pg=PA72&dq=industrial+waste+accounting&hl=ru&sa=X&ved=0ahUKEwi04IjH2tzaAhXQI1AKHY3QAzEQ6AEIJjAA#v=onepage&q=industrial%20waste%20accounting&f=false

48. Wang, L.K., Hung, Y-T., Lo, H.H., Yapijakis, C. 2007. Hazardous Industrial Waste Treatment. Retrieved from https://books.google.by/books?id=wDlmB9FBrJsC&pg=PA5&dq=industrial+waste+accounting&hl=ru&sa=X&ved=0ahUKEwi04IjH2tzaAhXQI1AKHY3QAzEQ6AEILjAB#v=onepage&q=industrial%20waste%20accounting&f=false

49. Gricishen, D.O. 2015. *Accounting in the management system of economic and environmental safety of industrial enterprises*. Zhitomir: Published by ЖДТУ.

50. Pronin, S.I. 2004. Development of an organizational and economic mechanism for implementing a cleaner production strategy at industrial enterprises in Russia. Retrieved from http://www.dissercat.com/content/razrabotka-organizatsionno-ekonomicheskogo-mekhanizma-realizatsii-strategii-bolee-chistogo-p

51. Volynkina, E.P. 2007. Development of the concept of waste management and development of a methodology for its implementation at a metallurgical enterprise. Retrieved from http://www.dissercat.com/content/razvitie-kontseptsii-upravleniya-otkhodami-i-razrabotka-metodologii-ee-realizatsii-na-metall

52. Rubanova, N.N. 2005. Environmental accounting at construction materials industry enterprises. Retrieved from http://www.dissercat.com/content/ekologicheskii-uchet-na-predpriyatiyakh-promyshlennosti-stroitelnykh-materialov

53. Grosheva, M.A. 2006. Innovative investment support for the processing of oily waste. Retrieved from http://www.dissercat.com/content/innovatsionno-investitsionnoe-obespechenie-pererabotki-neftesoderzhashchikh-otkhodov

54. Umerov, R.Z. 2000. Mechanisms for the economic improvement of industrial waste management in the region. Retrieved from http://www.dissercat.com/content/mekhanizmy-ekonomicheskogo-sovershenstvovaniya-upravleniya-promyshlennymi-otkhodami-v-region

55. Lapytova, O.V. 2004. Economic and ecological analysis of the enterprise: theory, methodology, methodology and organization. Retrieved from http://www.dissercat.com/content/ekonomiko-ekologicheskii-analiz-deyatelnosti-predpriyatiya-teoriya-metodologiya-metodika-i-o

56. Cheysova, M.P. 1984. Perfection of statistics of industrial wastes (on an example of the enterprises of Khabarovsk territory). Retrieved from http://www.dissercat.com/content/sovershenstvovanie-statistiki-promyshlennykh-otkhodov-na-primere-predriyatii-khabarovskogo-k

57. Petukhov, V.I., Litvinec, O.L., Taskin, A.V., Holodov, A.S., Ivannikov, S.I. 2016. System of industrial waste accounting and recycling in Primorsky Territory, Russia in the context of European experience, *International Journal of Environmental and Science Education*, Vol. 11(Issue 18): pp. 12604-12612

58. Antanenkova, E.A. 2012. Industrial waste: accounting and tax accounting, *Accounting, Vol. 12: pp.24-29*

59. Panchenko, T.M. 2016. Industrial waste: accounting and tax accounting, *Accounting, Vol. 1: pp.37-40*

60. The Law of the Republic of Belarus on July 20, 2007 № 271-3 "On waste management"

61. Decision of The Council of Ministers of The Republic of Belarus on October 23, 2009 No. 1391 "On Approval of the List of Hazardous Wastes, Transactions on the Transfer of which for a specified period (except for the contract of carriage), as well as alienation of which to another legal entity or individual entrepreneur handling waste, are subject to registration"

62. Decree of the Ministry of Economy of the Republic of Belarus, the Ministry of Architecture and Construction of the Republic of Belarus, the Ministry of Industry of the Republic of Belarus on June 15, 2006 N 98/12/10 "On approval of The Instruction on the accounting, storage, use and sale of ferrous and non-ferrous metals, their scrap and waste"

63. State Standard of the Republic of Belarus STB 2026-2010. Secondary black metals. General specifications

64. Technical Code of Good Practice 17.11-10-2014 "Environmental Protection and Nature Management Waste: Rules for the Management of Construction Waste"

65. Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus on November 8, 2007 No. 85 "On Approval of the Classifier of Wastes Formed in the Republic of Belarus"

66. The Instruction on Waste Management of petrochemical enterprise OJSC "Naftan"

67. Order of the Ministry of Economy of the Republic of Belarus on October 11, 1999 №99

68. GOST 30773-2001 "Resource-saving. Waste management. Stages of the technological cycle", adopted by the Interstate Council for Standardization, Metrology and Certification (Minutes No. 19 of May 24, 2001)

69. ISO 14001 Environmental management

70. Law of the Republic of Belarus on July 12, 2013 No 57-Z [Amended as of June 4, 2015] "On Accounting and Reporting**"**

71. Order of the Ministry of Industry of the Republic of Belarus No. 273 on June 5, 2015 "On Approving Methodological Recommendations for Forecasting, Accounting and Calculating the Cost of Products (Goods, Works, Services) in Industrial Organizations of the System of the Ministry of Industry of the Republic of Belarus"

72. Sushko, V.A. 2018. Construction waste of the petrochemical complex at the technological cycle stages of waste under the application conditions of environmental technologies of their disposal and recycling, *Accounting, analysis and auditing*, Vol. 4(256): pp. 34-40

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(13)

Svetlana VEGERA is the Doctor of Economics, professor habil. and the First Vice-Rector of Polotsk State University. Research interests: problems of economic analysis and control development in the context of sustainable development, methodology of accounting for natural capital, corporate social reporting, accounting development in the context of "green economy".
ORCID ID: orcid.org/0000-0002-5717-6109

Alena MALEI is the candidate of economic sciences, associate professor, the head of the department of accounting and auditing, logistics and management. Research interests: financial logistics, logistic costs, sustainable urban mobility, the development of accounting in waste management in the context of "curcular economy", sustainable development.
ORCID ID: orcid.org/0000-0002-5331-0032

Ina SAPEHA is the candidate of economic sciences, associate professor of the department of accounting and auditing, logistics and management. Research interests: accounting for assets and liabilities of the organization, risks in the accounting system, financial indepence and industrial waste management.
ORCID ID: orcid.org/0000-0003-0205-0880

Volha SUSHKO is the assistant the department of accounting and auditing, logistics and management, master of Economic Sciences. Research interests: accounting and analytical support of financial independence management, industrial waste accounting in petrochemical complex in the context of "green economy", assesment issues of indusdtrial waste.
ORCID ID: orcid.org/0000-0001-5036-2200

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

ACCOUNTING DEVELOPMENT OF NATURAL RESOURCES IN ORGANIZATIONS CARRYING OUT THE DISPOSAL OF MUNICIPAL WASTE AND BIOGAS EXTRACTION IN THE CONTEXT OF THE "GREEN" ECONOMY

Svetlana Vegera[1], Elena Malei[2], Renata Trubovich[3]

[1,2,3] Polotsk State University, 29 Blokhin street, Novopolotsk, The Republic of Belarus

E-mails:[1]svegera@mail.ru; [2] maleialena@yandex.by; [3] renatalv@tut.by

Received: 19 Marvh 2018; accepted 7 May 201 published 30 September 2018

Abstract. Since the end of the 20th century, in the context of developing rational consumption of natural resources, energy efficiency and solving environmental problems related to the management and burial of municipal waste, there is a need to take into account the consumption of natural capital, its degradation, as well as to determine the growth of gaseous energy resources in assessing economic growth in both the whole country, and in a separate organization that buries municipal waste and extract biogas. Therefore, the authors set forward the objective of the research: to develop the account of gaseous resources stocks (biogas) and assimilation resource as elements of natural capital. For the purpose of the achievement of aim, the authors apply generally accepted economic research methods. The article considers the economic essence of assimilation and gaseous energy resources of municipal waste as new objects of accounting. Both accounting objects are considered as long-term assets. The authors propose an accounting model for natural resources, which provides with information on the consumption of ecosystem capital and its degradation. It is proposed to estimate the assimilation potential of the environment at fair value (according to the current market) in the presented accounting model. As a result of the study on the possibilities of applying parallel accounting for long-term natural resources, we propose to account the gaseous resources in two assessments: on the one hand, based on actual costs associated with investing in the formation and attraction of alternative technogenic energy resources in economic activity, on the other hand - at the fair value (current market value) of the methane stocks.

Keywords: municipal waste, biogas, technogenic energy resource, mineral resource, natural capital, assimilation resource, assimilative potential, assimilative capacity

Reference to this paper should be made as follows: Vegera, S.; Malei, A.; Trubovich, R. 2018. Accounting development of natural resources in organizations carrying out the disposal of municipal waste and biogas extraction in the context of the "green" economy, *Entrepreneurship and Sustainability Issues* 6(1): 211-225. http://doi.org/10.9770/jesi.2018.6.1(14)

JEL Classifications: Q29, Q42, Q53, Q57

Additional disciplines: ecology and environment

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

1. Introduction

Changes in approaches to assessing sustainable development, the economic potential of the country in the 21st century, have made it necessary to take into account natural capital and its reflection in the reporting of business entities. Wealth accounting, including natural capital accounting (NCA), is needed to sustain growth. Long-term development is a process of accumulation and sound management of a portfolio of assets—manufactured capital, natural capital, and human and social capital (Natural Capital Accounting, 2016). Natural capital accounting can help deliver the SDGs by making explicit the links between the economy and the environment, enabling sustainable policy decisions and actions, and monitoring progress (Natural Capital Accounting and the Sustainable Development Goals, 2016). In 2012, at the Rio + 20 Conference on Sustainable Development, seventy-five countries and the European Commission supported the Communique on the call of Governments, the United Nations system, international financial institutions and other international organizations to take more active measures to include the natural capital in the macroeconomic indicators calculation throughout the world. (A mass demonstration of support measures to integrate natural capital at a summit in Rio, 2012).

Researching problems in accounting of organizations that carry out the municipal waste disposal and the biogas extraction, we propose to consider new objects of accounting - an assimilation resource and an energy resource of municipal waste (biogas) as elements of the natural capital. At present time the energy potential of landfill gas (biogas) as an alternative source of energy and, simultaneously, as an element of natural capital is not reflected in the accounting system of organizations in the Republic of Belarus and in international practice. The organizations reflect only the actual costs of forming and attracting the alternative gaseous resource into economic activity, which are capitalized as part of fixed assets and intangible assets. There is no correlation in the accounting system between the indicators of municipal waste flows, the biogas stocks formation, its consumption flows and the flows of greenhouse gases into the atmosphere (Malysheva, 2013). The environmental assimilation potential (the ecosystem's stability to anthropogenic impact), as a component of natural capital, is not reflected in the accounting system.

Various aspects of including information on the usage of natural capital in accounting and calculating are viewed in works of foreign and native authors such as: Altuhova Y.V., Rishar J., Zamula I.V., Shiribokov V.G., Shevlukov A.P. , Metla O.S., Vegera S.G., etc. The authors consider various approaches of natural resources accounting and the possibility of including them in financial statements. Scientists are investigating in general the existing problems in approaches to evaluate natural resources, types of natural rent, the possibility of including natural resources in the composition of assets at fair (market) cost, and not only at historical cost. Metla O.S., Vegera S.G. emphasize the problem of the absence of a system that takes into account the links between the indicators of the use of natural capital and the economic results of the business entity. The authors have developed a system of accounting for mineral resources as an element of natural capital (Vegera, Metla, 2015). There are enough researches devoted to accounting and evaluationt of biological assets in literature. At the same time, today scientists haven't paid attention to accounting to such specific natural resources as landfill gas and assimilation resources. Neverov A.V., Voropaeva O., A., Robert Constanza and many other scientists consider only approaches to measuring ecosystem services in value terms (Neverov, Voropaeva, 2012; Constanza, 1997).

Among the defined unresolved issues in accounting system the purpuse of this research is the theoretical justification and the accounting development of anthropogenic gaseous resources (biogas) and assimilation resources as the elements of natural capital for organizations engaged in waste disposal and biogas extraction.

The objects of the research are natural resources: technogenic gaseous resources that are derived from municipal waste under the influence of the natural environment and assimilation resource of the ecosystem within the municipal waste disposal site. The choice of the research objects is due to the topicality of issues of natural

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

resources valuation, reflection them in accounting and financial statements. These issues remain not sufficiently solved, while the indicators of natural resources stocks and their consumption are of practical importance in the context of the transition to sustainable economic development.

In order to achieve the target, the following tasks shall be carried out:
-to explore the essence for the identified natural resources from the point of the economic potential (stocks) of organizations carrying out the municipal waste disposal and the biogas extraction; scientifically substantiate and recognize biogas and environmental assimilation stocks as accounting objects;
- to conduct a comparative analysis of existing methods for valuation of long-lived assets including natural resources and to propose the methods of biogas and assimilation stocks evaluation in accounting based on stakeholders preferences;
- to suggest the system of the accounting and reflecting in financial statements the biogas and assimilation stocks, allowing to provide information on the used natural capital and its degradation.
The scientific novelty of the results - is the recognition of technogenic gaseous resources of communal waste (biogas stocks) and assimilation resources as an accounting objects, as well as the development of accounting methodology for natural resources.
The presented system of natural resources accounting can find its practical application by its implementation in the normative documents of the Republic of Belarus, the CIS countries, the EU. In the research there are applied the methods of general scientific research in economics: of economic analysis and synthesis, logically – constructive, qualitative methods including the methods of the analysis of normative acts. Theoretical and methodological basis of a research are: the standard and legislative documents regulating waste management, energy saving, environmental management, environmental protection in Republic of Belarus and neighboring countries, in the EU; the normative documents regulating accounting in the Republic of Belarus, IFRS; special literature of domestic and foreign scientists; Internet sources.

2. The economic essence and recognition of a technogenic energy resource of municipal waste as an asset in accounting

In the context of a wasteless economy, all municipal wastes have a resource value. However, the resource component of municipal waste in itself as economic category exists within technological capabilities of the state and the commercial profitability of garbage use. Investigating the activities of organizations that deal with the waste burial, we came to the conclusion that municipal waste, which are directed to burial do not represent economic value at the period of collection unsorted garbage. Such waste is treated primarily as an object, which it is necessary to get rid of in environmentally safe conditions in controlled landfills.

The bulk of organic wastes mixed with inorganic ones enter the burial sites, where all wastes lose their resource value. However, biological processes in the body of the landfill with household wastes are inevitable. Fermentation microorganisms break down complex organic compounds (waste) into simpler ones. These less complex organic substances are a source of nutrition for another group of bacteria - methane-forming bacteria, which convert organic acids into methane-biogas (garbage gas). Methane has an energy potential, so gas generation in the body of a landfill can to fill up national raw material base in production, subject to the availability of technological capability and economic profitability of biogas extraction to the surface of the landfill. So, a new economic category is emerging, which affects the level of national security and is one of the conditions for sustainable development.

Below is a schematic representation of the chain of biogas formation in thelandfill body. The figure is based on the study of the life cycle of municipal waste and biogas utilization (Camobreco, Ham, Barlaz, 1999; Isa, Johari, Hashim, 2014)

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

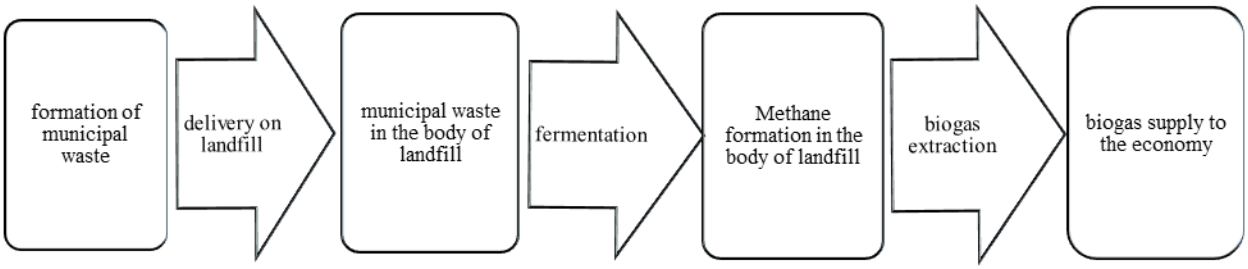


Fig. 1. The chain of biogas formation in the landfill body

Source: author's construction based on the studied special literature

Thus, municipal wastes in the presented chain have material utility in the body of the landfill, as they are a product of consumption for a microbiome. Municipal wastes do not cease to be one of the biogas formation sources. Since municipal wastes by themselves are a direct threat to the environment (including potential emission of greenhouse gases into the atmosphere), at the stage of collection and accumulation in the body of the landfill, they are subject to mandatory assessment in physical units of measurement.

The methane presence in the biogas shows the natural origin of the resource. The essential difference between this deposit and natural ones is the absence of gas-tight insulation, as a consequence of which, without the rapid extraction of gas at the same time as its generation, the resulting biogas will simply be emitted into the atmosphere, contaminating it. Confirmation of the fact that biogas is a part of mineral substances is indicated by an almost identical chemical composition with natural gas (Biogas of the landfill site as a source of energy, 2017). Thus, biogas reserves as a component of mineral resources form the energy potential of a separate organization and the state as a whole. In turn, mineral resources are the basic component of the national security of any country and an element of the national wealth of each country.

Growing environmental problems of a global scale in the field of municipal waste disposal are the main reason for the emergence of a new industrial sector-the extraction of garbage gas (biogas) at burial sites. At the same time, the environmental problem is not the only impetus for the development of the biogas industry. The tasks of avoiding the total dependence of the countries rich in hydrocarbons, the reorientation to alternative energy sources remain relevant at the international level to this day. So, technogenic gaseous resources in our study represent the energy and economic potential (methane stocks) generated by decomposition of waste utilities in the body of the landfill under the influence of microorganisms; the extraction of technogenic gas resources on the earth's surface and its further use implies environmental and economic feasibility. It should be noted that the quantitative evaluation of biogas in the body of the landfill is being expressed by its stocks, the value of which is being established by specialists on the basis of data on the volume and composition of wastes, temperature in the body of the landfill, climatic conditions and other parameters.

The technogenic gaseous resource can act as an asset of the organization if it meets the criteria of the asset. According to the concept of international financial reporting standards, the asset is a resource controlled by the organization as a result of past events, from which future economic benefits are expected to flow into the organization. So, in the Republic of Belarus under the law "About accounting and report" assets are considered to be "property, appeared in organization as a result of performed economic operations and that causes receiving

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

economic profit". Thus, in the Republic of Belarus there are the following assets peculiarities: right of property for the object, so called right of use, disposition (right of ownership); the presence of economic profit. According to the current legislation of the Republic of Belarus, a technogenic gaseous resource cannot be included in the composition of assets, since the exclusive right to own the components of the natural environment belongs to the state. Consequently, the ownership of the technogenic energy resource (biogas), as a component of mineral resources, belongs to the state.

Reflecting values as balance assets for which there is a right of ownership, is the fundamental objective of static accounting. It's necessary to emphasize that the order of priority of content against form is included into "The main principles of preparation and presentation of financial reports": if the information should truly represent operations and other events, so it's necessary for this information to be taken into account in accordance with their content and economic essence and not only with legislative form". The principle of priority of content against form is fixed in Law "About accounting and report" of the republic of Belarus and other countries. Absence in the balance of this indicator distorts information about the resource and economic potential of the organization. While the economic potential of a business entity reflects the ability to ensure its long-term functioning and the solution of its strategic tasks.

It is necessary to note that biogas as a part of minerals is national wealth of each country, however at this time in the Republic of Belarus, it is not considered the object of economy and it is not joined in calculating of national wealth of the country. National accounts do not record the consumption of biogas as an element of natural capital in the process of economic activity, and, accordingly, the natural capital contribution to the economic component of the state. Therefore, the system of accounting does not provide necessary informational base for estimation of macroeconomic indicators of stable country development (net inner product, index of adapted net savings, "Green" GDP etc.)

In order to disclose information about the economic facts, that meets the interests of some consumers of financial statements, it is considered permissible to apply the dynamic theory of accounting to accept the technogenic gaseous resource of municipal waste as an asset. Thus, IFRS(IAS) accept the dynamic theory of accounting based on the principle of reflecting all used assets on the balance sheet irrespective of their ownership. The significance of reflecting all natural resources (both owned and not owned by an organization according to the property rights) on the balance sheet is noted in the works of such native and foreign scientists as Vegera S.G., Metla O.S. Shevlukov A.P., Altuhova Y.V., Shirobokov V.G. (Vegera, Metla, 2015; Shevlukov , 2009).

We believe that the recognition of technogenic gaseous (energy) resources as long-term assets in accounting will be correct. The explanation for this is the unstable and prolonged emission of biogas in the body of the landfill for several years. So, in accounting, the stocks of technogenic gaseous resources of municipal wastes are long-term assets that are a part of the mineral resources (established by the results of laboratory tests and expert evaluations).

3. The economic essence and recognition of assimilation resource as an asset in accounting

Today, the ecosystem (natural) capital in the international practice involves all the elements of the natural resource potential that contributes to the increase in national wealth. The ecosystem (natural) assets include natural resources, resources regulating and supporting the functioning of the ecosystem and other resources. In economic literature, publications, international reports «Ecosystem Resources» are frequently identified with the category of «environmental services». This identification of the concepts is due to the fact that the very ecological services of the ecosystem are just a special form of consuming the ecosystem resource, the use of which brings certain benefits (Tabekina, Fedotova, 2013).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

According to the main international standards focusing on the classification of ecosystem services (resources), ecosystems from a functional point of view are provided by regulatory and supporting (preserving) services (resources), one of which involves a waste assimilation. R. Constanza, H. Daley, F. Torez, S.N. Bobylev, V.M. Zakharov, N.I. Bazylev notice the ability of ecosystems to rework (decompose) waste, to control pollution, to maintain the level of detoxification. Consequently, the category of «ecosystem services (resources)» includes the service (resource) of waste assimilation by ecosystems, providing benefits to society by ensuring the undisrupted functioning of an ecosystem (Constanza, 1997; Daley, Farley, 2003; Bobylev, Zakharov, 2009).

While studying the accounting of organizations engaged in waste disposal, it seems advisable to consider the «assimilation resource» of an ecosystem as an accounting object. The lack of interpretation in the normative documentation of the Republic of Belarus and neighboring countries, in special literature has made it necessary to identify the characteristic features of an ecosystem «assimilation resource» as an ecological-economic category based on the analysis of such concepts as « assimilation capacity» and «assimilation potential» in special literature.

So, Vishnyakova S.M., Vishnyakov G.A., Aleushkin V.I., Bocharova N.G., Nikitenko U.V. understand the assimilation potential as: «the enviromental ability to absorb, assimilate waste resulting from specific production activity within specific natural complexes and ecosystems. Shimova O. S. provides the following definition: «The assimilative potential is the ability of the natural environment to neutralize, absorb and process a certain amount of harmful substances without changing its basic properties». Crepsha N. in her writings describes the assimilation potential as follows: «If the amount of pollutants released into the environment, does not exceed the allowable limit of emissions, the territory itself, without any additional environmental costs, copes with incoming harmful substances and eliminates them without significant consequences»(Crepsha , 2011). In our opinion Gofman K. G., Mamontov Y. I. and Usmanov V. V. supplement the definition of the assimilation potential interpreting it as –«.....natural resource..» or «....specific natural resource...»

The assimilative capacity of the environment in the works of S. V. Dorozhko, S. A. Horeva is «its ability to assimilate anthropogenic impact without damaging itself. Assimilative capacity is treated as a special kind of natural resources» (Dorozhko, Horeva, 2008 p.165). In publications called «Assimilative capacity» Sharon Beder notes that the environment has an assimilative capacity, which is able to absorb waste without long-term damage. Tom Barker, Martin Mortimer and others mention that the ability of an ecosystem to withstand load without losing its functional properties is determined by its capacity or resistance (Biodiversity, ecosystems and ecosystem services, chapter 2, 2010).

The analysis of the above interpretations of «assimilation potential» and «assimilative capacity» shows that the authors single out the same key characteristics of an ecosystem resource – the ability of the natural environment to absorb, neutralize, recycle waste without significant consequences. Thus, on the basis of the carried out analysis, we consider it permissible to give the following characteristics to the studied category of «assimilation resource»:
1. Ability: to neutralize, absorb and process wastes within a certain anthropogenic load; to move waste outside the ecosystem; to resist contamination;
2. Natural/ecosystem resource.
Thus, from an economic point of view the waste assimilation of an ecosystem is an assimilation resource that is able to withstand the ecosystem pollution through: absorption, neutralization, waste treatment within a specific anthropogenic load, and to move them outside the ecosystem.

Considering the value of the assimilation resource, the following features should be noticed:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

- the size of an ecosystem capable to assimilate waste. According to the Technical Code of the Republic of Belarus an ecosystem is «...a part of the natural environment that has spatial boundaries....»;
-the abiotic component of an ecosystem (climatic conditions: light, temperature and humidity; soil factors, the factors of water environment, topography factors):
- the biotic component (plants, zoogenic and microbiogenic factors),
-the intensity of substance and energy exchange within the ecosystem.
In their turn, the qualitative characteristics of an ecosystem do not possess equivalent (identical) possibilities of waste assimilation.

Moreover, the time lag of waste absorption and assimilation depends on the origin of waste (wood, mineral and so on), the source of waste formation, its aggregation state, toxic properties, the method of waste burial, storage and disposal. Therefore, the impact of waste on the natural environment and its capacity to recover could be: negligible, weak, moderate and strong.

Thus, the intensity of waste assimilation and consequently the use of the assimilation resource by society depend directly on the territorial and qualitative characteristics of ecosystem, as well as on the source of waste formation, its aggregate state, toxic properties and methods of burial (storage, disposal). Since the value of the assimilation resource depends on the factors established above, it is considered appropriate for the accounting system to examine this resource from the point of view of the expected flows at which an ecosystem absorbs (assimilates) these or those wastes over a certain period of time. Accordingly, the expected assimilation flows should be measured by the acceptable waste load of a ditch in physical terms (tones) within the territorial space of the investigated ecosystem (m2, m3).

It should be noted that the process of consuming this ecosystem resource involves changes in the quality of the resource flow, but not in its quantity. Unlike other natural resources it is impossible to create reserves of ecosystem flows of waste and emission assimilation. They cannot be used more or less at the request of the consumer. The assimilation resource can be an asset of an organization if it meets the criteria of an asset. Similarly, like the technogenic energy resource, the assimilation resource is a component of the natural environment, the ownership of which belongs to the state. Consequently, according to the Legislation of the Republic of Belarus an assimilation resource cannot be reflected on the balance sheet as an asset in organizations involved in the disposal of waste. The absence of this indicator on the balance sheet distorts the information about the resource potential of organizations dealing with waste disposal, because the activities of these organizations do not reflect the consumption of ecosystem capital, and it eliminates the possibility to calculate the following indexes: ecological capacity, stability of ecosystems, consumption of natural capital, national well-being and, among other things, the size of national wealth.

In order to reveal the information content about the facts of economic life that meets the interests of some consumers it is considered permissible to apply the dynamic theory of accounting to accept the assimilative resource as an asset. As we have noted, IFRS (IAS) accept the dynamic theory of accounting based on the principle of reflecting all used assets on the balance sheet irrespective of their ownership.

This study of environmental and economic essence of the category of ecosystem services (resources) testifies to the fact that consumers benefit from indirect or direct use of an ecosystem resource. The very possibility to reduce environmental costs by using the assimilation resource brings economic benefits. Along with economic benefits, the assimilation resource provides environmental benefits. The assimilation resource is a specific object, consequently its value largely depends on the qualitative and spatial characteristics of an ecosystem location.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

As organizations involved in waste landfilling regularly emit waste into the environment, the consumption of the assimilation resource flow is a constant process. That is, the use of this resource is continuous and long-term. In this connection, it is considered appropriate to recognize this asset as long-term.

In addition to the general recognition criteria of an asset the waste assimilation resource has specific features that make this facility different from other ecosystem assets (subsoil, forests, water): the absence of material form; the possibility of consumption only in the process of using the environment. Based on the conducted research general and specific characteristics of the asset are presented in table 1

Table 1. General and specific features of the asset «assimilation resource»

General features	Specific features
Resource for long-term use	Ecosystem (natural) resource
Able to bring economic benefits	Has no material form
	Has qualitative characteristics rather than quantitative
	Consumption is measured by flows over a certain period of time (ton/m3, tons/m2)
	Resource consumption is possible in the process of using the environment
	Able to provide stable (steady) functioning of ecosystems within a certain anthropogenic load
	A resource that brings ecological benefits

Source: author's construction based on the studied special literature

Given the characteristics of this asset, we propose the following definition for the assimilation resource as an object of accounting: The assimilation resource is a long-term asset that represents a continuous flow of an ecosystem resource produced by the functionally interrelated components of the environment, which is able to absorb, neutralize, recycle a certain amount of waste or emissions within allowable anthropogenic load, to move them outside this ecosystem, thereby providing its stable (steady) functioning; on the one hand, the flow changes of this resource depend on the qualitative characteristics of an ecosystem (natural components), on the other hand, they are influenced by anthropogenic impacts caused by an economic entity (man). In its turn, the assimilation resource may be subsequently consumed or subjected to degradation.

With increasing anthropogenic pressures above allowable limits, the processes of absorption, waste disposal and restoration of the natural environment get broken. The ecosystem loses its functional potential, stability, capacity to assimilate waste. From the environmental point of view, such an ecosystem is considered degrading. The quality of animal and human habitat deteriorates, the risk of body intoxication and chronic diseases increases and so on. Such an ecosystem ceases to function with the same effect or the quality of its functions (services) changes. In the publication «The System of Environmental Economic Accounting 2012— Central Framework» (developed by the UN Statistical Commission in 2012) the inability of ecosystems to generate the same range, quantity or quality of ecosystem services on the regular basis is called degradation. Degradation considers changes in the quality of environmental assets in terms of their ability to bring a wide range of benefits known as ecosystem services as well as the extent to which this capacity may be reduced through the action of economic units, including households (Central Framework -System of Environmental Economic Accounting, 2012).

The System of Environmental-Economic Accounting 2012: Experimental Ecosystem Accounting defines degradation as: « The decline in the quality of an ecosystem asset over an accounting period due to economic and other human activity. It is generally reflected in declines in an ecosystem condition and/or declines in the expected flow of an ecosystem service. The extent of the ecosystem degradation will be influenced by the scale of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

analysis, the characteristics of the ecosystem asset, and the expectations regarding the use of the ecosystem asset in the future. Ecosystem degradation may be measured in physical and monetary terms» (The System of Environmental-Economic Accounting 2012: Experimental Ecosystem Accounting, 2014 p.155). The degree of the ecosystem degradation is evaluated according to the criteria that define adverse changes in the structure and functioning of ecosystems and take into account their spatial differentiation according to the degree of disturbance and the dynamics of degradation processes.

In native and international managerial practice there are certain regulations, standards or limits on emissions, dumping and storage of waste and concentration of pollutants in the natural environment, the compliance of which does not cause the degradation of natural components and respectively leads to their proper functioning and the expected flow of ecosystem resources. Thus, degradation in the environment is deterioration in qualitative characteristics of an ecosystem, caused by the negative impact of human activities, reflecting the irreversibility in recovering sustainable functioning of the interrelated components of the natural environment within a given ecosystem.
In accounting, organizations involved in waste disposal, should consider degradation as the excess consumption of the ecosystem resource flow (assimilation resource) over established norms in the process of economic activities, which leads to the dysfunction of a component of the natural environment; or as the termination (decrease) of the expected flow of an ecosystem resource caused by the dysfunction of a component of the natural environment due to third-party entities,

4. Evaluation of natural resources

Proceeding from the fact that the stocks of methane formation in the body of the landfill (which will be the added value of the organization) are of commercial interest, and the municipal wastes stocks are of ecological interest, the economic evaluation can be assigned only to the energy potential in the body of the landfill. In turn, municipal waste flows, their accumulation are subject to mandatory assessment in physical units for rational management and forecasting of the emission of gaseous resources in the body of the landfill.

As it was already noted, there are no data on the economic value of gas reserves in the accounting of organizations that extract biogas from the landfill body. The lack of such data leads to a decrease in the information content of the reporting and does not allow to assess the resource and economic potential. Accordingly, the investment attractiveness of the organization is missed, the possibility of receiving government subsidies is declining. The organizations reflect only the actual costs of forming and attracting a technogenic gaseous resource into economic activity, which are capitalized as part of fixed assets and intangible assets. This is the cost of acquiring a license for economic activity, the right to use the land and the cost of disposal facility, of equipment that monitor temperature and humidity in the body of the landfill, wells and pumps and other devices. At the same time, according to the legislation of the Republic of Belarus in the accounting of fixed assets and intangible assets and in IAS 16 these costs can subsequently be subject to revaluation at current market prices. As a result, the revaluation distorts the information on the costs of the formation of technogenic gaseous resource and its involvement in economic activity for the analysis of the effectiveness of the invested funds.

To address the issue in determining the type of assessment of a long-term asset as a technogenic gaseous resource, we analyzed the scientific works of J. Richar, Y.V. Sokolov, M.I. Kuter, M.L. Pyatov, N.M. Karzaeva, S.G. Vegera, O.S. Metla. Scientists are considering approaches to assessing long-term natural resources and are of the opinion that the choice of the type of assessment should be consistent with the goals set for the organization. And the idea of simultaneous application of static and dynamic balance concepts for accounting of long-term natural assets is currently extremely urgent (Vegera, Metla, 2015).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

The idea of a static balance theory is based in the calculation and reflection of data in financial statements about the organization's ability to pay off its debts. Thus, the valuation of assets at current market prices (fair value) is the principle of the static balance theory. The valuation at fair value provides for the analysis of the property position. Accordingly, the main users of reporting static theory are lenders. The idea of a dynamic theory is based on the reflection in the reporting of the effectiveness of the organization's activities, the calculation of financial results. Valuation of assets at historical cost is the principle of dynamic accounting theory. The owners of the company are interested in such accounting information. The combination of the two accounting theories within a single balance sheet is justified by the desired results- the reflection in accounting and financial reporting of data both on property status and on the effectiveness of the business entity. Such an idea helps to fix actual costs by attracting natural resources to economic activity (according to the dynamic theory of balance), which provide a basis for analyzing the effectiveness of investments in the formation and attraction of resources. While accounting of natural resources at current market value (according to the static balance theory) will allow assessing the resource potential and investment attractiveness of the organization.

As a result of the study on the possibilities of applying parallel accounting for long-term natural resources, we propose to account the technogenic gaseous resources as a long-term asset in two assessments: on the one hand, based on actual costs associated with investing in the formation and attraction of alternative technogenic energy resources in economic activity (costs of economic activity right and so on, the costs of acquiring devices to maintain temperature level in the body of the landfill, bioreactors, wells and pumps, etc.), on the other hand - at the fair value (current market value) of the methane stocks.

Reassessment of market value and depreciation of technogenic energy resources (methane reserves) should be carried out according to changes in current market prices, as well as according to changes in the volume of stocks in the body of the landfill, based on laboratory analysis and expert evaluation.

The meaning of the economic evaluation of ecosystem services is to determine the value, and hence the importance for a person of all kinds of benefits derived from ecosystem services. The first large-scale assessment of world ecosystem services was carried out in 1997 by the American scientists. By their calculations, the nature provides to mankind ecosystem services on average for $33 trillion annually that exceeds world GDP almost twice ($18 trillion a year, in the prices of 1997) (Vahrusheva, 2016). For reliable analysis of the activities of organizations involved in municipal waste disposal, an important issue is also assessment of the assimilation resource.

Approaches to the economic value of ecosystem resources consumption in recent years has acquired a special relevance over the world in connection with the methodological problems caused by the complexity of the valuation of ecosystem services and natural interactions. Over the past few years, international organizations such as the United Nations, the World Bank, the World Wildlife Fund have actively promoted scientific research on the economic valuation of ecosystem services (resources). Within the framework of waste management, international experience indicates a mechanism for compensating for the use of ecosystem services (resources). The mechanism is based on the need to compensate for damage caused by harmful effects on the environment. Purchase and sale of additional environmental impact units in the state have promising market relations. The unit of environmental impact saved by the organization can be formed by improving technology or restructuring production.
Therefore, we believe it makes sense to reflect in accounting the assimilation resources at fair value, i.e. at current market prices. The reassessment of the assimilation resource should be carried out with a change in market prices or by monitoring the ecosystem sustainability.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

As we propose to assess the assimilation resource at market value, it is necessary to mention about the accounting system of the property rights acquisition (licenses, permits) for nature objects. According to the Decree of the Ministry of Finance of the Republic of Belarus on accounting of intangible assets and IAS 38, property rights refer to intangible assets.

Thus, acquired limited proprietary rights to the object of nature management (ecosystem, land) together with the assimilation resource, in accounting should be assess at actual costs. These are the costs associated with the attraction (involvement) of assimilation resource and resolution of its consumption. As a result of the study, we propose to account the assimilation resource as a long-term asset in two assessments: on actual costs, associated with attraction of ecosystem resource in economic activity, at the fair value (current market value)-assimilation potential.

5. An accounting system and the natural resources reflection in the financial statements in organizations carrying out the burial of municipal waste and the extraction of biogas

Recognizing technogenic gaseous resources as assets in the system of accounting and financial reporting, information about methane stocks is proposed to be reflected on the subaccount XX.X “technogenic gaseous (energy) resources”, opened to synthetic account XX “Mineral Resources”. It should be noted, that the system of mineral resources accounting should reflect not only information about biogas stocks, but also include information on its consumption. Consumption should be considered as extraction of biogas from the landfill body, which leads to a reduction in biogas stocks. Therefore, it is proposed to register information about consumption on a separate passive subaccount XX.X “Consumption of technogenic gaseous resources” of account XX “Depletion (consumption) of mineral resources”.

To reflect the potential of the assimilation resource at fair value in accounting and reporting, we suggest using a separate synthetic account: XX "Assimilation Resources". The credit turnover will reflect resource consumption (reduction in value), degradation, and debit turnover - attraction of additional flows of assimilation resource (increase in value). Consumption of assimilation resource and ecosystem degradation makes sense to be reflected in a separate passive synthetic account XX "Consumption and degradation of ecosystem resources", with the opening of additional sub-accounts:
XX.1 – "Consumption of assimilation resource within the limits of norms"
XX.2 –"Consumption of assimilation resource in excess of the established limits (degradation)"

Such subaccounts system will allow to take into account differences in the approach to the consumption process: on the one hand, the consumption of the flow of the assimilation resource within the norms established by specialists, and, on the other hand, the reflection of ecosystem's degradation.

Speaking of biogas (garbage gas) and assimilation resource as elements of natural capital, we recall the existing need for accounting of natural capital in the 21st century. The natural capital contribution to economic development was investigated by: R. Konstanza, H. Daley, Brendar Fisher, Kerry Tyurner, Bazylev N.I., Bobylev S. N. and many other scientists. As well as the study of the contribution of natural capital are paying attention representatives of the collective co-authorship of public and international organizations of the «Big eight» countries, preparing reports on the economics of ecosystems and biodiversity (The Economics of Ecosystems and Biodiversity-TEEB).
As for the accounting of natural assets, we have analyzed the scientific works of Shevlyukov A.P., Altukhova Y.V., Shirobokov V.G., J. Richar, Vegera S.G., Metla O.S. The recognition of a natural resource by an organization's assets presupposes the existence of a balancing item in the passive side of the balance sheet. Shevlyukov A.P., Altukhova Y.V., Shirobokov V.G. consider “natural capital” as a source of formation of land

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

plots and natural resources of state property. Considering the accounting problem of the sources of land plots on which the organization has no rights of ownership, Vegera S.G. suggests in the passive side of the balance sheet as the source of such asset to consider "the attracted natural capital" and reflect it on the separate account (Vegera, 2011). Paying attention to the fact that the objects of burial are exploited in the process of landfill functioning and of biogas extraction on lease / temporary use of ecosystem objects, we share the scientific justification of Vegera S.G. in the part of reflecting in the balance sheet as a source of formation of natural resources not of natural capital as such, but of attracted natural capital.

Both negative and positive effects of the use of natural capital should be reflected in the accounting. According to Vegera S.G, the ecological and economic result of land use should express additional ecological (anti-ecological) capital, which the author suggests to reflect on the active-passive account -XX "Additional ecological (anti-ecological) natural capital" or "Attraction of an additional anti-ecological (ecological) natural capital ". Consequently, in the case of consumption of ecosystem resources above the permissible norms (limits), which leads to degradation (as a result of predatory use), it is advisable to fix the negative effect of nature use on the active-passive account XX "Attraction of an additional anti-ecological natural capital". The debit of this account reflects the increase in the additional anti-ecological capital, the credit- its reduction.

Positive impact on the natural object (ecosystem object) will be reflected in the accounting as: the credit should take into account the growth of additional ecological natural capital, the debit - its decline. Thus, reflecting on the debit of the account "assimilation resource" and the credit of the account "Attracted additional ecological natural capital", the value of assimilation potential increases due to the improvement of the ecological state and additional ecological natural capital. So, the information on this account will reflect the ecological and economic effect of anti-ecological or ecological management. The proposed methodology will provide information on the direct dependence of: the organization's own capital and the contribution to the country's natural capital reproduction as part of national wealth.
With regard to actual costs. The cost of forming methane stocks in the activities of economic entities is suggested to be capitalized on the accounts "Investments in long-term assets", "Fixed assets" or "Intangible assets". So, the costs for the formation of technogenic gaseous (energy) resources will include the cost of those facilities that are directly involved in the process of methane generation, namely: the right to use land plots (burial objects), devices for maintaining the optimum temperature level in the body of the landfill, drainage systems and other devices. In the balance sheet, the source of assets at the actual cost of forming and attracting mineral resources will be either own capital or liabilities. In turn, it is necessary to reflect the costs of permission (license) for the assimilation resource consumption as an intangible asset in accounting. In the balance sheet, the source of intangible assets at the actual cost will be either own capital or liabilities.

Conclusions

With the purpose of determining economic growth and solving environmental problems and ensuring sustainable development of nature management, there is a need to develop accounting for natural resources in organizations that carry out municipal waste disposal and biogas extraction. In this connection, we have presented in this article: the economic essence of biogas reserves and assimilation potential as accounting objects; a natural resources accounting system and reflection them (resources) in financial statement.

Based on the highlighted goal and tasks of the research, the following final clauses can be singled out:
1. In the study we have scientifically justified the recognition of new accounting objects in organizations carrying out municipal waste disposal and biogas extraction:
- the «technogenic gaseous (energy) recourse of municipal wastes», which is a long-term asset in the form of stocks of mineral substances in the landfill body, and which has economic potential.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

- assimilative ecosystem stability as "assimilation resource (potential)", which is a long-term asset.
2. To keep accounting of the studied objects is offered in two aspects:
2.1«technogenic gaseous (energy) recourse of municipal wastes»
-accounting at actual costs (historical cost) for the generation of technogenic gaseous (energy) resource of municipal wastes and its attraction to economic activity. We propose to capitalize the costs of forming and attracting technogenic gaseous (energy) resources, which will be included in fixed assets or intangible assets. Through the process of calculating depreciation, these costs will fall into the composition of the costs of the main activity of the organization (extraction of biogas). According to the dynamic theory of balance, the reflection of biogas stocks at actual costs for their formation and involvement in economic activity will provide a basis for analysis of efficiency of investments in technogenic natural resources:
-accounting at fair value (current market value) of biogas stocks. According to the static balance theory, biogas stocks accounting at the current market value will allow estimating the resource potential and investment attractiveness of the organization. The process of consumption of technogenic gaseous resources in accounting will reduce the value of technogenic natural resource.

2.2 «assimilation resource (potential)»:
- at actual costs, take into account the acquisition of licenses, permits for consumption of the assimilation resource and include them in the value of intangible assets;
- at fair value, take the assimilation stock (potential) of the ecosystem. The process of consumption in accounting will reduce the value of assimilation resource.
3. In the balance sheet as a source of formation of the investigated long-term assets in the valuation at historical cost is the company's own capital or liabilities. The source of the natural resources (economic potential) in the market value assessment is the attracted natural capital.
4. The biogas extraction on the surface of the landfill should be considered in accounting as consumption (depletion) of mineral resources; the consumption of the assimilation resource makes sense to be divided into consumption within the limits of norms and in excess of norms, leading to degradation of assimilation stability.
5. The negative effect of nature management as a result of the anti-ecological consumption of the assimilation resource, leading to ecosystem degradation, should be reflected in the accounting with the use of the supplementary account " attraction of an additional anti-ecological natural capital".

The proposed accounting system will provide an opportunity for further assessing the contribution of natural capital to the development of the business entity and the state as a whole. It will provide the necessary information base for calculating macroeconomic indicators of the country's sustainable development, characterizing human progress taking into account the natural factor.

References

Natural Capital Accounting, March 31, 2016. Available on the Internet: http://www.worldbank.org/en/topic/environment/brief/environmental-economics-natural-capital-accountingCamille Bann, International Institute for Environment and Development. Policy Briefing: Natural Capital Accounting and the Sustainable Development Goals. Retrieved from: https://unstats.un.org/unsd/envaccounting/londongroup/meeting22/BK_5.pdf

A mass demonstration of support measures to integrate natural capital at a summit in Rio, 2012. Retrieved from: http://www.worldbank.org/ru/news/2012/06/20/massive-show-support-action-natural-capital-accountingrio-summit.

Altuhova Y.V., Rishar J., Shiribokov V.G., 2009 Uchetno-informacionnoye obespechenie ustoychivogo razvitiya I racionalnogo prirodopolzovaniya [Accounting and information support of sustainable development and environmental management] Retrieved from: https://cyberleninka.ru/article/v/uchetno-informatsionnoe-obespechenie-ustoychivogo-razvitiya-i-ratsionalnogo-prirodopolzovaniya

Vegera, S.G., Metla, O.S., 2015. "Assessment and accounting of mineral resources as part of natural capital: problems and solutions" Buhgalterskij uchet i analyz [Accounting and analysis], no. 9, pp. 8-15.

Robert Constanza, 1997 Value of world's ecosystem servivices and natural capital/ Robert Constanza [et.al.] // Nature. – London, 1997. – Vol. 387/15. – p. 253–260

Malysheva, M. S. 2013. Organization, the Main Directions and Objectives of Economic Analysis Environmental Performance, *Contemporary Economic Issues* 4. https://doi.org/10.24194/41301

Neverov A.V., Voropaeva O., A., 2012. Stoimostnaya ocenka ekosystemnyh uslug I biologicheskogo bioraznoobraziya [Valuation of ecosystem services and biological diversity] Retrieved from: https://elib.belstu.by/bitstream/123456789/3484/1/26-neverov.pdf

V. Camobreco, R. Ham, M. Barlaz, 1999. Life-cycle inventory of a modern municipal solid waste landfill. Retrieved from: http://journals.sagepub.com/doi/pdf/10.1177/0734242X9901700602

Isa A. S, Johari A., Hashim H., Mat R., Lim J. S., Ngadi N., & Ali A. (2014) Optimal landfill gas utilization for renewable energy production, Environmental Progress & Sustainable Energy. Retrieved from: http://www.ccacoalition.org/en/resources/optimal-landfill-gas-utilization-renewable-energy-production

Sirius Group, 2017. Biogas of the landfill site as a source of energy. Retrieved from: http://srsgroup.su/biogaz-poligona-tbo-kak-istochnik-energii.php

Shevlukov A.P., 2009. Paradigmy russkoy modeli schetovodstva kapitalnogo imuschestva [paradigms of the Russian model of capital assets accounting]. Gomel, The Republic of Belarus, pp. 128-129

Daly, Herman E. Ecological economics: principles and applications / by Herman E. Daly and Joshua Farley/ pp.107. Retrieved from: http://indomarine.webs.com/documents/Ecological_Economics_Principles_And_Applications.pdf

S.N. Bobylev, V.M. Zakharov, 2009 Ecosystemniye uslugi I economika [Ecosystem services and economics] pp. 7-11/ Retrieved from: http://sustainabledevelopment.ru/upload/File/Books/Inst_book_7.pdf

Krepsha, N.V., 2011. Ekonomika prirodopolzovanija i prirodoohrannoy deyatelnosti [The economics of nature management and environmental protection]. Retrieved from: http://bookbk.net/book/116-yekonomika-prirodopolzovaniya-i-prirodooxrannoj-deyatelnosti-krepsha-nv/32-53-assimilyacionnyj-potencial-prirodnoj-sredy-i-ego-yekonomicheskaya-ocenka.html

Dorozhko, S. V., Horeva S. A., 2008 Osnovi ekonomiki prirodopolzovaniya [the economy basis of nature management], Minsk, BNTU [Belarusian national technical university], 2008.-165c.

Barker Tom, Mortimer Martin, 2010. Biodiversity, ecosystems and ecosystem services. Chapter2 Retrieved from: http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-2-Biodiversity-ecosystems-and-ecosystem-services.pdf

System of Environmental Economic Accounting 2012— Central Framework. Retrieved from: https://unstats.un.org/unsd/envaccounting/seearev/seea_cf_final_en.pdf

System of Environmental-Economic Accounting 2012: Experimental Ecosystem Accounting, 2012. Retrieved from: http://ec.europa.eu/eurostat/documents/3859598/6925551/KS-05-14-103-EN-N.pdf

Tabekina, O. A.; Fedotova, O. V. 2013. Features of the Process of Ecologization of Russian Enterprises, *Contemporary Economic Issues* 2 https://doi.org/10.24194/21307.

Vahrusheva, K. Ekonomicheskaya ocenka ekosistemnyh uslug [Economic evaluation of ecosystem services], «Ekologiya i pravo» [«Ecology and right»]. Retrieved from: http://bellona.ru/2016/07/14/ecology-economy/)

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(14)

Vegera, S.G., 2011. Razvitiye metodologii bukhgalterskogo ucheta zemli v kontekste sovremennoy teorii renty [Land accounting methodology within the context of the state-of-the-art rent theory], Vegera, S.G., Novopolotsk, The Republic of Belarus. Retrieved from: http://docplayer.ru/53829259-S-g-vegera-razvitie-metodologii-buhgalterskogo-ucheta-zemli-v-kontekste-sovremennoy-teorii-renty.html

Svetlana VEGERA is Doctor of Economic Sciences, Associate professor, First pro-rector of Polotsk State University. Research interests: problems of accounting development, economic analysis and control in the context of sustainable development concept; methodology of natural capital account; corporate social accountability.
ORCID ID: orcid.org/0000-0002-5717-6109

Alena Malei is Associate professor, head of department of Business Accounting and Audit, Logistics and Management in Polotsk State University. Research interest: the development of accounting in the context of «green» economy.
ORCID ID: orcid.org/0000-0002-5331-0032

Renata Trubovich is Master of Economic Sciences, assistant of department of Business Accounting and Audit, Logistics and Management in Polotsk State University. Research interest: the development of accounting in the context of «green» economy.
ORCID ID: orcid.org/0000-0003-2455-705X

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/

Publisher
http://jssidoi.org/esc/home

STRUCTURED LITERATURE REVIEW ON BUSINESS PROCESS PERFORMANCE ANALYSIS AND EVALUATION

Jolanta Zemguliene[1], Mantas Valukonis[2]

[1] Faculty of Economics and Business Administration, Vilnius University, Saulėtekio 9 Vilnius, Lithuania
[2] Kaunas Faculty, Vilnius University, Muitinės 8 Kaunas, Lithuania

E-mail:[1] jolanta.zemguliene@ef.vu.lt, [2] mantas.valukonis@knf.vu.lt

Received 3 March 2018; accepted 10 June 2018; published 30 September 2018

Abstract. Knowledge of business process analysis instruments and methods enhance the possibility to quantify process management decisions and to achieve organizations' goals. While the amount of research on business process analysis and evaluation increases, there is a need to outline the intellectual structure of scientific research as embodied in business process scientific literature in order to define the streams of research. The purpose of this paper is to present actionable knowledge of business process performance analysis and evaluation, based on the framework, integrating business process research domains and levels of analysis. In order to establish a framework, integrating the domains of business process analysis, the research questions were formulated and the analysis of the scientific literature was carried out applying the method of structured literature review. Literature review was based on a research papers that were available through the EBSCO host, Academic search complete databases. References were searched using the keywords that are formed as combinations of words: business process, analysis, performance, evaluation. Research contributions, addressing the business process analysis topic, were selected by the keywords within the papers' title, abstract and in the keywords specified in the article. After the initial evaluation of 677 papers, 62 articles were selected for in-depth analysis. This paper contributes to the business process management research by proposing the framework to integrate various business process analysis research streams and highlighting exploratory potential areas for future inquiry.

Keywords: business process; business process performance; process evaluation; business process performance indicators

Reference to this paper should be made as follows: Zemguliene, J.; Valukonis, M. 2018. Structured literature review on business process performance analysis and evaluation, *Entrepreneurship and Sustainability Issues* 6(1): 226-252. http://doi.org/10.9770/jesi.2018.6.1(15)

JEL Classifications: M11

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

1. Introduction

Business process capability to deliver the output that fits the requirements of the efficient use of process resources and the needs of the customer is recognized to be the basis for the overall development of business organization and capability to achieve the competitive advantage. Organizations based on horizontal end-to-end processes have been shown to increase the quality of products and services, decrease costs and make business functions more reliable (Khosravi, 2016). Therefore, the issue how the improvement in business process capability should be achieved is discussed in voluminous business process studies and reports. Business process reengineering, business process management and business process improvement approaches provide various models, methods and techniques designed to develop the business process. Most of them involve process analysis as the distinctive point in the execution of process improvement. Davenport and Short (1990), Hammer and Champy (1993), defining the business process reengineering, emphasized the analysis of workflows and processes as the initial step for radical process redesign. Dumas et al. (2013) provided business process management method which is typically designed to explore existing processes and provide the relevant information for process improvement decisions. This method describes the steps of process management by process identification, discovery, analysis, redesign, implementation, monitoring and controlling. Van der Aalst (2004) identified the importance of business process analysis in business process management systems and also noted that process workflow management systems lack the tools for the process analysis and do not support the use of the data, logged by the information system to diagnose the operational processes.

Process analysis provides the tools to understand the sources of the problems of process accomplishment, to discover the possible ways of process improvement and optimization and also the measures of performance assessment (Irani et al., 2002). Much has been discussed on business process analysis in the literature. Vergidis et al. (2006) provide~~s~~d an overview on business process analysis, underline~~s~~d types of process analysis in relation to the different business process modeling techniques. Li et al. (2004) proposed the framework for the process workflow analysis, which involved the perspectives of logical level, temporal level and performance level. Bisogno et al. (2016) proposed a method for the analysis of business process operational performance. This model is applicable for what-if analysis. Various studies provide different models and frameworks designed to enable process analysis. They describe process' features and properties and explore process domains in relation to the purpose of analysis. As Aguilar-Saven (2004) identified "purpose of business analysis is either to learn about the process, to make decisions about the process or to develop business process". Furthermore, purpose of the analysis is coherent to the perspective of the analysis.

Process level perspective is associated to the knowledge of the processes, whereas process analysis from the operation level perspective generate the knowledge of the process' impact on the operation's and enterprise performance, process is a unit in the enterprise' set of processes. Due to popularity of business process orientation in various business settings, a number of business process analysis methods and techniques to support process building and management were provided in the literature. While the attempts to generalize the process evaluation methods were provided, there is a lack of guide that organizes methods for business process analysis according to perspective of analysis. Generalization of business process analysis' perspectives support systematization of the knowledge in the area of business process analysis and provide insights of the areas of potential enquiry in this field.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

The *purpose* of this paper is to present a framework of business process performance analysis and evaluation, integrating business process constructs and levels of analysis. The following questions are addressed in this paper:

(1) What are the main research questions considered in the research on business process elements and properties?
(2) What are the main trends in the research on business process performance analysis?

2. Elements, structure and properties of business process

Voluminous business process definitions, provided in the literature, emphasize the interrelated activities as the basic element of the business process. The order, positioning, sequence and interdependence of the activities provide the structure of the set of activities. Business process activities enable a capability to convert process inputs and resources to an output, acceptable to the customer. Aguilar-Saven (2004) defines business process as "the combination of a set of activities within an enterprise with a structure describing their logical order and dependence whose objective is to produce a desired result". Laakso (1997) describes the business process as "a structured, measured set of activities and flows that use necessary resources of the organization to provide specified output for a particular customer ". Antilla and Jussila (2013) define a process as productive activity, which include working for something, moving of people, materials and information, and interacting. Activities they define as elementary processes which make up the processes, and people are considered as most important resources and actors in business processes (Antilla and Jussila, 2013, p. 920). Similarly, Davenport (1993), Hammer and Champy (1993) suggest the main elements of the business process – activities positioned at the time and place with the definite determination of the beginning and an end, also elements of process' input and an output that is of value to a customer. Exploring the concept of business process, Bekgaard (2009) generalizes that process activities include "movement, manipulation, consumption of materials and information, and coordination, control and evaluation of work tasks performed by the actors – employees or customers". Bekgaard (2009) introduces event – based process ontology. It represents the process as the set of events, which have participants, objects, descriptive properties, information and consequences for business operations and processes state.

Business process is described by the set of its properties. Quantification of the process properties enable to measure the process. As Cardoso (2008) defined, "business process measurement is the task of empirically and objectively assigning numbers to the properties of business processes in such a way so as to describe them"

Operation of the business process activities is determined by the process attributes of variety and complexity (Antilla and Jussila, 2013), as Antilla and Jussila (2013) noted, there were three types of variety modes of process activities – mechanistic, organic, dynamic. Cardoso (2008) define process complexity as "the degree to which a process is difficult to analyze, understand, or explain. It may be characterized by the number and intricacy of activity interfaces, transitions, conditional and parallel branches, the existence of loops, roles, activity categories, the types of data structures, and other process characteristics" (Cardoso, 2008, p.53). Cardoso (2008) also defined other process properties - cost, maintainability, and reliability.

Business organizations are the systems of processes and structures. According to their functionalities, processes are associated to the particular domains, as of the domain, there are market processes, customer processes, management processes, support processes (Antilla and Jussila, 2013). Dervitsiotis (1999) distinguishes basic processes (which deliver product to external customer), support processes (which deliver materials and information to internal customers) and core or critical processes (which affect critical success factors of business organization).

Description and design of the process is generally qualified in process modeling approach. Process model includes process activities, agents (actors), roles, artifacts (Curtis et al., 1992). Curtis et al. (1992) explored the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

process model elements by functional, behavior, organizational, informational perspectives. Authors attach activities and flows of artifacts, data and products to the functional activity. Sequencing of activities, feedback loops, activity iteration authors relate to behavior perspective. Process agents, physical media and appliances used for transfer of entities were attached to organizational perspective. Informational entities of data, artifacts, products, objects are represented by informational perspective. Process structure is complex, therefore diagnostic of the process attributes, effects and results require the examination from various perspectives.

3. Analysis of business process improvement and effects

An analysis of business processes covers a variety of approaches to improving business processes. Business process reengineering, business process redesign, business process management, provide the knowledge about the methods, tools and techniques, which enable process transformation, and also address the principles and methods for evaluation of the effects, associated to business process transformation. Business process analysis enables to identify process problems, to develop process changes and to evaluate the effect of process redesign. Business process analysis is equally important due to the consistency of process performance and organizations performance. Existing literature provide a holistic approach to business process analysis, which supports the idea that the goal of development of business performance can be achieved through improved processes. Given this approach, the task of developing optimal business process can't be solved improving and optimizing single process in the system of organizational processes. A broad overview of the literature on the impact of process orientation is provided by Kohlbacher (2010). This author summarizes that positive effect of organizations' process orientation on business performance is predominant finding in the studies. Also the effects of customer satisfaction increase, quality improvement, cost reduction, financial performance improvement are identified (Kohlbacher 2010, p.135).

Due to the importance of process analysis for the process development as well as business development, there is still a need for further research on process analysis methods and concepts. However, Davamanirajan et al. notices, "process level analysis is still in its infancy" (Davamanirajan, 2006, p.66).

In the literature business process analysis is presented by various approaches, methods and techniques, therefore, identification of the types of analysis, based on the purpose of analysis is useful for perceiving processes and selecting the appropriate method. Notable review and typology regarding business process analysis was provided by Vergidis et al. (2008). The authors have highlighted these types of process analysis: observational analysis, validation, verification, performance analysis and evaluation, and simulation. Mostly analytical methods have been proposed for performance analysis and evaluation.

4. Method

A meta-analysis was carried out to analyze the research questions. Structural literature review has been adapted in accordance with the guidelines for systematic literature reviews provided by Boellt and Cecez-Kecmanovic (2015). Topic of the structural literature review was defined as "business process performance analysis", keywords for the systematic search were derived from the research questions.

Literature review was based on a research papers that were available through the EBSCO host, Academic search complete databases. Initial selection criteria for paper to be included in the review were based on the object of the research provided. *Business process* was selected as the object for the scientific researches. The keywords for the search were constructed as combination of the words: business process, analysis, performance, evaluation. Scientific papers related with the keywords mentioned above were selected for the literature review. Full text

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

papers written in English and published in the journals that apply peer review were included for literature analysis.

5. Results and discussion

After the search the initial sample has reached 677 papers. The papers for the content analysis were selected after more detailed analysis of abstracts and body of the text. 62 full text papers were considered for content analysis. Content analysis of identified articles provided the evidence and support in extracting the knowledge relevant to answer research questions.

The papers were analysed on the basis of the method and purpose of research, main findings and techniques. Considering the research questions, papers were categorized in two groups. Articles in the first group consider issues relevant to business process attributes and elements, whilst papers of the second group – business process analysis (Appendix 1, Appendix 2, Appendix 3). Six papers cover the both topics (Dervitsiotis, 1999, Corradini et al., 2015, Hadasch et al., 2016, Bergener et al., 2015, Torres, Sidorova, 2015, Solaimani, Bouwman, 2012).

In regard to first research question, contributions of the authors in exploring the characteristics of business process were examined. Knowledge of business process properties is relevant to increasing the effectiveness of business and process management activities, as well as substantiating business strategic decisions.

Categorization of processes (highlighting the most important ones) is relevant for justifying business enterprise management decisions, strategic business decisions and process outsourcing solutions. Research of business process categorization methods in this regard is relevant in solving business administration problems. The identification of key, critical, strategic processes is based on setting process performance criteria and their link with the company's strategic goals and success factors. The authors propose different methods to distinguish the underlying processes. Dervitsiotis (1999) describes *critical or core processes* in terms of process contribution in achieving strategic goals. An author identified typical process performance criteria and the method to identify critical process by its weighted contribution to strategic goals. Quesada, Gazo (2007) further developed the research on core, key or critical business processes by providing the methodology designed to define *critical internal processes* in terms of their strength of relationship with the critical success factors. Also Climent et al. (2009) defined critical processes in bank setting, and Hanafizadeh et al. (2009) provided methodology for selecting *strategic processes* in the investment company.

The improvement of the business enterprise process system is supported by knowledge of the specific processes that improve the overall performance of the system. Specific processes for specific activities, that enable efficiency of the whole process' system, are explored in the papers. Justification for *regulative processes*, also value creation activities of the process and activities associated to abuse prevention are provided by Regev et al. (2005). Characteristics of collaborative processes and *generic collaborative business process* modeling framework is investigated by Bouchbout et al. (2012). P*rocess of reviewing performance* is developed by Najmi (2005). S*upplier integration* and high level business process to govern supplier integration within new product development is investigated by Cadden, Downes (2013).

Process identification is relevant to the development and improvement of business processes. Process design solutions in a business enterprise are formed by distinguishing the process properties associated with the desired and undesirable process performance results. Also process eligibility criteria are required to formulate business decisions related to enterprise processes. In this regard are actual criteria of correctness of business process, based on formal verification of the process, explored by Corradini et al. (2015). Other authors provide a solution and

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

method for enabling another important business process feature - the user's compliance with the process. Process tool of directive explanations, designed to enable user's process compliance, was analysed and evaluated by Hadasch et al. (2016). Undesirable process performance results are associated to process uncertainty, complexity, weakness. Literature provide an analysis of these process properties. Cardoso (2008) explores the *complexity* characteristic of business process, investigating the concept of complexity and providing the metric to assess the control-flow complexity of business process. U*ncertainty characteristic of business processes* and measure to assess uncertainty in new processes was investigated by Helquist et al. (2012). Bergener et al. (2015) investigate *process weakness*, identifying pattern-based approach to detect process weakness automatically. Innovative approach of *event based concept of process*, defining the process as the set of events rather than the set of activities, was introduced by Bekgaard (2009).

The knowledge of impact and application of business process elements are of value in increasing the business process capacity. Process elements such as configuration characteristics, process capital, components of inter-organizational and intra-organizational interaction have significant impact on process results. One of the problems in operationalization of the process elements, such as the process capital, is the measurement issue. Considerable contribution in exploring business process capital is provided by Shang, Wu (2013). Authors suggested indicator consisting of measures of value of process capital input and output, and capability to manage process. As the employee motivation is desirable assumption of process management, one of the tasks of the business process administration is to motivate employees by introducing effective motivation tools in the organization. In this regard the findings provided in the survey of Torres, Sidorova (2015) are relevant. Results of their survey confirm the effect of work settings on employee, highlighting the mode how process *configuration characteristics* impact process participants' motivation. Business process researchers provide measures to address the practical issues in the formation of business decisions related to the business process alignment within business model. Solaimani, Bouwman (2012) identified *generic components of inter-organizational and intra-organizational interaction* and provided conceptual framework for business process alignment within business model.

It can be summarized that the recent studies of business process features and elements explore the process designed for specific functional purposes rather than the general purpose of achieving organizations goals (collaborative, regulative processes). Deployment of the functional processes creates benefits in terms of the knowledge on functional process design and operation. It is noteworthy also, that a generalized analysis that highlights the trend of research in terms of the characteristics and elements of the process is not possible due to insufficient data compatibility.

The main business value obtained through research results (application areas)	Business process elements and properties		Reference
Justifying enterprises' management decisions, strategic decisions, process outsourcing	**Business process type according to process purpose:**		
	Process types by process performance link with company's strategic goals	*critical or core processes, critical internal processes*	Dervitsiotis (1999) , Quesada, Gazo (2007), Climent et al. (2009)

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

solutions		*strategic processes*	Hanafizadeh et al. (2009)
Improvement of the business enterprise process system	*Process types by specific activity that enable efficiency of the system*	*regulative processes*	Regev et al. (2005)
		collaborative processes	Bouchbout et al. (2012)
		process of reviewing performance	Najmi (2005)
		high level business process of supplier integration	Cadden, Downes (2013)
Process design solutions	**Business process properties**	*correctness of business process*	Corradini et al. (2015)
		users' process compliance	Hadasch et al. (2016)
		uncertainty characteristic of business processes	Helquist et al. (2012)
		process weakness	Bergener et al. (2015)
		complexity	Cardoso (2008)
Process capacity building solutions	**Business process elements**	*process configuration characteristics*	Torres, Sidorova (2015)
		event based concept of process (conceptual approach to the structure and functioning of the process)	Bekgaard (2009)
		process capital	Shang, Wu (2013)
		generic components of inter-organizational and intra-organizational interaction	Solaimani, Bouwman (2012)

The main research questions considered in the research on business process elements and properties are summarized in table 1. Research frameworks, methods and techniques for investigation of process properties are summarized in Appendix 2.

Table 1. The main research questions considered in the research on business process elements and properties (The list of sampled papers N=17)

Source: developed by authors

In regard to second research question, main contributions of the authors in exploring the business process analysis are examined. Studies on business process analysis are focused on understanding the effects of process performance on the business performance. It responds to the needs of the business enterprise to properly construct and control business processes by applying appropriate tools for process design and appropriate systems for the evaluation of business process' operation and enterprise performance. Taking into account the value of research findings for various activities and functions of the business enterprise, the following areas are distinguished:

i) connection between the performance of the process and the performance of the business – summarizing studies, the results of which are of value for process and business evaluation and control;
ii) improvement of process performance impact on business performance – summarizing studies, the results of which are of value for business process modeling and development;
iii) business process performance measurement – summarizing studies, the results of which are of value for process evaluation and control;
iv) business process as a part of value chain – summarizing studies, the results of which are of value for the development of business systems.

Connection between the performance of the process and the performance of the business.

The authors choose different perspectives for the analysis. Some of them consider exploring the effect by selecting appropriate indicators of process performance and business level performance and evaluating the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

relationship between the performance parameters variation. Hachicha et al. (2016) proposes ontological model for the assessment and analysis of collaborative processes by considering the consolidation of business level performance (based on key performance indicators) and process performance (based on technical indicators). That approach reflects two basic assumptions. The first is that the results of the process affect the results of the business, and secondly, the process evaluation and analysis concepts, methods and tools must be determined in such a way as to cover the causal factors, that is, the results and parameters of the operation of the process, and the consequences factors, that is, performance and parameters of business operation.

Different perspectives of the process performance analysis consider a holistic approach to the organization. Based on this point of view, processes are not only an integral part of a business organization, but processes are considered as antecedents of specific way by which the business enterprise operates. This specific business operation mode is characterized by property of business organization's process orientation. Consequently, focus on the effects of process performance on the business performance capture business organization's process orientation parameters instead of process performance parameters. As a whole, this exploratory approach is expressed in the research of Kohlbacher (2010), Kohlbacher and Gruenwald (2011). Kohlbacher (2010) provided an overview of studies that analyze the impact of process orientation on the results of a business enterprise. The author concludes that positive effects are prevalent in all studies. Kohlbacher and Gruenwald (2011) provided a multidimensional construct of process orientation designed to measure process orientation of the business enterprise.

Improvement of process performance impact on business performance

Studies on business process performance analysis are focused on exploring the methods and tools that enable to evaluate and enhance the impact of process improvement on the performance of the organization. Consistent with the view that the goal of the process analysis is to improve the process by improving the process's impact on the possibility to attain the goals of the organization, the results of the research highlight the analytical tools designed to enhance the impact of the process on business outcomes.

The methods of enhancement of process impacts presented in the articles are based on the principle of process selection (Darmani and Hanafizadeh, 2013; Lee et al., 2005), the assessment of the company's ability to improve the process (Nichlods, Mo, 2016), the identification of the coherence of the process results with the business results (McCormack, Rauseo, 2005; Franceschini et al., 2013; Dervitsiotis, 1999; Espino-Rodriguez, Rodriguez-Diaz, 2014; Valiris, Glykas, 2004). Darmani and Hanafizadeh (2013) propose process selection methodology designed to increase probability of business process reengineering success. Lee et al. (2005) present a method for evaluation of business process alternatives, based on the analysis of expected impact of the process on the stated goals of performance. Nichlods and Mo (2016) present a model quantifying the relationship between the enterprise's capability to process improvement and post-improvement performance. McCormack and Rauseo (2005) explore high-level business process map of the enterprise that can be used as a mean of aligning business strategy to process strategy and design. Franceschini et al. (2013) propose a methodology for the evaluation of the impact of performance measurement system on the specific areas of an organization. Dervitsiotis (1999) explore the method (based on Riggs matrix) for evaluation of business process value adding contributions to attain organization's strategic goals. Espino-Rodriguez and Rodriguez-Diaz (2014) develop a methodology to identify operations of the order fulfillment process, related to core competences of an organization. Valiris and Glykas (2004) explored the agent relationship morphism analysis (ARMA) techniques for business process redesign aimed to improve the effectiveness of business processes and operations.

A lot of research aimed at revealing ways to improve the process from the point of view of performance and outcomes. Studies on business process performance analysis are focused on improvement of process design

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

(Andersson et al., 2005; Yu et al., 2016; Bosch-Mauchand et al., 2013; Anastassiu et al., 2016; Bolsinger et al., 2015; Torres, Sidorova, 2015; Bisogno et al., 2016; Zhu et al., 2014; Samaranayake et al., 2015; Coskun et al., 2008), IT impact on process performance (Davamanirajan et al., 2006; Hadasch et al., 2016; Abu Rub, Issa, 2012), improvement of the tools for process modeling (Bocciarelli, D'Ambrogio, 2014; De Padua et al., 2014; Li et al., 2004; Corradini et al., 2015; Bergener et al., 2015; Samaranayake, 2009; Vergidis et al., 2008; Helquist, 2009; Wynn et al., 2009; Vom Brocke et al., 2010), evaluation and improvement of process quality (Nestic et al., 2015).

Andersson et al. (2005) propose using process patterns for business process reengineering and defined the state-flow modeling technique as a suitable mean for process pattern foundation. On the basis of an electronic group sales process case, Yu et al. (2016) present an experimental approach to evaluate process model design combining the principles of process design and experimental economics. Bosch-Mauchand et al. (2013) present a method designed to assess product development and production engineering processes in terms of performance and value, based on the principles of value chain and on the methods of knowledge management. Anastassiu et al. (2016) introduce a semi-structured procedural guide for the analysis of ontological transactions and for the identification of process contextual information relevant to the process objectives. Bolsinger et al. (2015) propose a decision model designed to provide a guidance for process improvement determining the parameters that maximizes the value contribution of the process. Torres and Sidorova (2015) provide the survey aimed to assess the impact of business process configuration on the motivation of process participants. Bisogno et al. (2016) explore a method designed to facilitate the analysis of the operational performance of business process and to test for potential process improvements. Zhu et al. (2014) introduce location-awareness in business process management research and explored pattern-based approach aimed to identify location-dependency in process models. Samaranayake et al. (2015) propose a framework of process modeling in hospital settings that covers associated processes, data and patient flow. Coskun et al. (2008) define model aimed to determine process weak points and to distinguish process improvement strategy considering improvement costs.

Davamanirajan et al. (2006) define a process performance model to quantify IT impact on process performance improvement and economic performance model designed to assess process performance effects on the enterprise performance. Hadasch et al. (2016) develop the concept of directive explanations – context dependent feedback to business process users aimed to influence user's process compliance. Abu Rub and Issa (2012) propose role activity diagramming technique aimed to model complex processes in the software industry sector. Bocciarelli, D'Ambrogio (2014) introduce Performability enabled Business Process Modeling Notation to enable prediction of automated business process behavior in terms of performance and reliability. Nestic et al. (2015) propose a fuzzy model for evaluation and improvement of process quality and presented a solution for quality assessment of purchasing process. De Padua et al. (2014) provide comparative study of the results from the applying business process modeling and root cause analysis techniques for the diagnostic of information technology management process. Li et al. (2004) provide framework for modeling and analyzing process workflow, based on a multidimension workflow net and the organization and resource information. Corradini et al. (2015) introduce formal process verification in public administration domain, based on formal verification technique using Petri Net notation. Bergener et al. (2015) explore pattern based process weakness detection approach designed to automatically detect process weakness in semantic process models. Samaranayake (2009) proposes a framework of process integration, automation and optimization in terms of functional applications, business workflows, and additional functionalities. Vergidis et al. (2008) provide a review of the literature on the process modeling techniques highlighting process analysis and optimization capabilities. Helquist (2009) presents a virtual process simulation technique aimed to model process alternatives, considering the geographic and team composition issues. Wynn et al. (2009) explore process verification technique designed to assess the correctness of process with cancellation and OR-joins. Vom Brocke et al. (2010) delineate a framework for process redesign that integrates financial considerations and process modeling.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

Some studies explore specific processes – electronic group sales process (Yu et al., 2016), product development and production engineering processes (Bosch-Mauchand et al., 2013), purchasing process (Nestic et al., 2015), information technology management process (De Padua et al., 2014), public administration processes (Corradini et al., 2015), complex processes in software industry (Abu Rub, Issa, 2012), processes in hospital setting (Samaranayake et al., 2015).

Business process performance measurement

A lot of researches explore ways to evaluate the process. Various process measurement concepts are based on the notion that process measurement is an instrument for managing the process and has an impact on process outputs and business outcomes (Robson, 2004, Jarrar, 2004). Robson (2004) discusses the effect of process performance measurement on the improvement of process and organizational performance. Jarrar (2004) summarizes the importance of performance measurement systems for business management and highlighted the streams of performance measurement development. The scientific literature not only introduces the approaches and methods of process performance evaluation, but also contains works summarizing the process evaluation studies (van Looy, Shafagatova, 2016, Gonzalez et al., 2010). Van Looy, Shafagatova (2016) explored the patterns in the research on business process performance measurement and provided categorized list of process related performance indicators. Gonzalez et al., 2010 carried out systematic review of literature that deals with business process measurement.

The papers present process measurement methods designed for specific purposes – measurement system aimed to consider specific levels of company performance (Khan and Wibisono, 2008), composite measure of the process aimed to measure process in terms of process goals (Yen, 2009), customer oriented process performance measurement system (Wieland et al., 2015), measurement system for corporate sustainability (Padua andJabbour, 2015), measurement of web-enabled processes based on key performance indicators (Pun et al., 2012), process assessment method aimed to assess environmental implications to technological processes (Sarkis et al., 2006), measure designed to enable selection of advantageous production system (Chin and Saman, 2004), performance measurement system aimed to measure internal processes in terms of enabling inter-organizational cooperation (Alfaro et al., 2009), performance measurement from the perspective of supply chain (Morgan, 2004). Khan and Wibisono (2008) propose a knowledge based process performance measurement system for designing and benchmarking of measurement system which considers five levels of company performance and techniques of analytic hierarchy process and gap analysis. Yen (2009) proposes the conceptual model aimed to create composite measure of business process, which consists of single measures relevant to process goals. Wieland et al. (2015) identified the requirements of customer oriented process performance measurement system based on customer demands and critical design features. Padua and Jabbour (2015) provide conceptual model of corporate sustainability performance measurement system considering specific issues relevant to sustainability. Pun et al. (2012) propose a process analysis method aimed to facilitate the analysis of traffic intensive web-enabled business processes in terms of key performance indicators evaluated according to audit trail data, web server logs and stress testing logs. Sarkis et al. (2006) introduce a methodology that involves activity-based costing, analytic hierarchy process and business process modeling techniques, which is intended to assess environmental implications in evaluating alternative technological processes. Chin and Saman (2004) explore a performance measure suitable for the selection of advantageous production system for a company. Alfaro et al. (2009) define the basic characteristics of performance measurement systems aimed to measure internal business processes in the perspective of inter-organizational cooperation. Morgan (2004) highlights the preconditions of effective performance measurement from the supply chain perspective.

Business process as a part of value chain

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

In some papers processes are analyzed as a part of value chain. Main focuse is on process integration, inter-organizational and intra-organization process interaction, process outsourcing issues. Berente et al. (2009) characterize process integration in terms of organizational, data-processing, and application integration and defined principles of process integration. Wu and Park (2009) introduce theoretical framework aimed to facilitate the implementation of process outsourcing decisions. Solaimani and Bouwman (2012) propose a framework aimed to improve the alignment between business model and business process considering the generic, horizontal and vertical inter-organizational and intra-organizational interaction components.

The main research questions considered in the research on business analysis are summarized in the table. Research frameworks, methods and techniques for investigation of process analysis are summarized in Appendix 3.

Table 2. The main research questions considered in the research on business analysis (The list of sampled papers N=51)

Business process analysis	Reference
Connection between the performance of the process and the performance of the business (N=3)	Hachicha et al., 2016; Kohlbacher, 2010; Kohlbacher and Gruenwald, 2011
Improvement of the process performance impact on business performance (N=8)	Darmani, Hanafizadeh, 2013; Nichlods, Mo, 2016; McCormack, Rauseo, 2005; Franceschini et al., 2013; Dervitsiotis, 1999; Lee et al., 2005; Espino-Rodriguez, Rodriguez-Diaz, 2014; Valiris, Glykas, 2004
Improvement of the process as a tool intended to generate performance (N=24)	Andersson et al., 2005; Yu et al., 2016; Davamanirajan et al., 2006; Bocciarelli, D'Ambrogio, 2014; Bosch-Mauchand et al., 2013; Nestic et al., 2015; de Padua et al., 2014; Li et al. 2004; Corradini et al., 2015; Hadasch et al., 2016; Abu Rub, Issa, 2012; Anastassiu et al., 2016; Bolsinger et al., 2015; Bergener et al., 2015; Samaranayake et al., 2015; Torres, Sidorova, 2015; Bisogno et al., 2016; Vergidis et al., 2008; Zhu et al., 2014; Helquist, 2009; Wynn et al., 2009; Samaranayake, 2009; Coskun et al., 2008; vom Brocke et al., 2010
Business process performance measurement (N=13)	Gonzalez et al., 2010; Khan, Wibisono, 2008; Yen, 2009; Wieland et al., 2015; Padua et al., 2015; Pun et al., 2012; Sarkis et al., 2006; Robson, 2004; Jarrar, 2004; Chin, Saman, 2004; Alfaro et al., 2009; Morgan, 2004; Van Looy, Shafagatova, 2016
Business process as part of value chain (N=3)	Berente et al., 2009; Wu, Park, 2009; Solaimani, Bouwman, 2012

Source: developed by authors

6. Framework integrating the domains of business process analysis

Conceptualization of business process, adopted in the business process analysis research enables to capture the streams of research and also to systematize accumulated knowledge of business process into three levels of analysis – process level, intra-organizational level and intra-organizational level.

Framework integrating the domains and levels of business process analysis summarizes the results of this study (Fig. 1).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

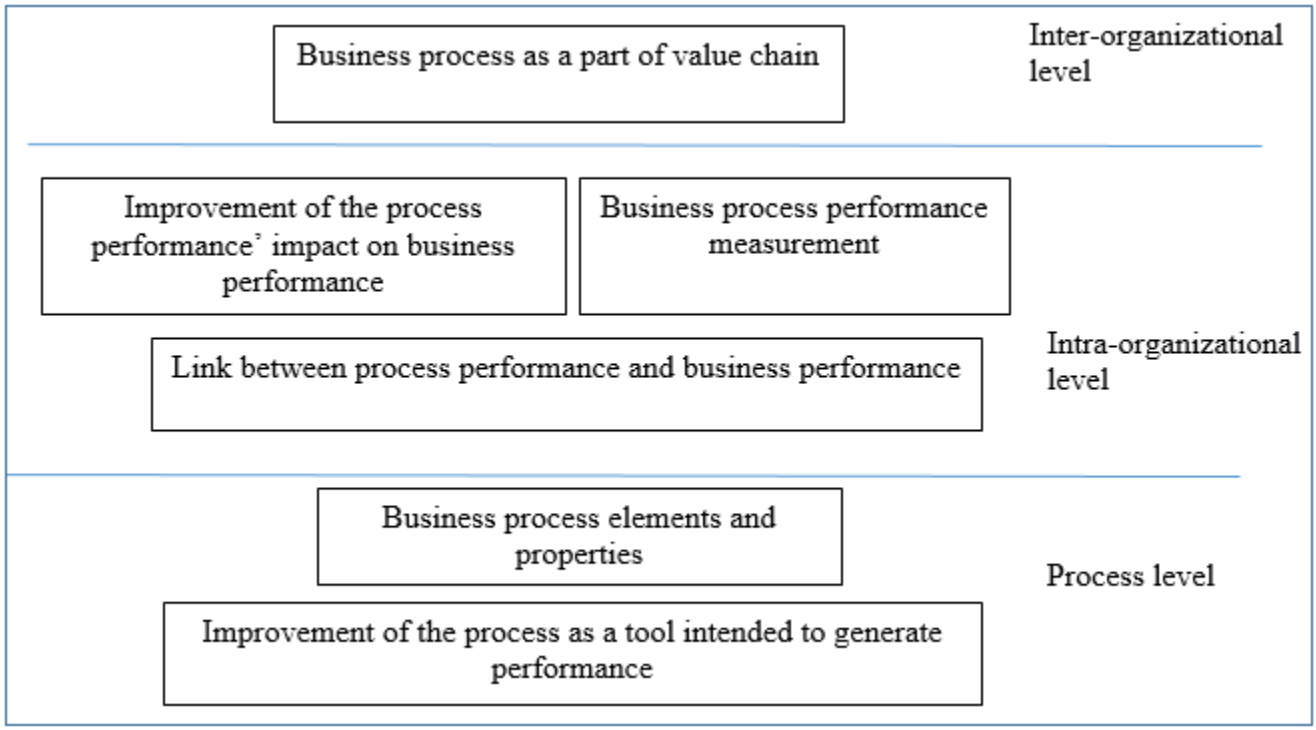


Fig.1. Framework integrating domains and levels of business process analysis
Source: developed by authors

After the content analysis of selected papers a few research streams were highlighted:

- Business process as a set of activities within an enterprise, designed to create value to the customer and generate value to organization
- Business process as a system of activities, participants, information, interactions, rules, which is a tool intended to generate performance
- Business process performance measurement
- Business process as a part of value chain.

Generalized process investigation directions distinguished in relation to the first research question: conceptual approach to the structure and functioning of the processes, business process type according to process purpose, business process properties, business process elements (N=17).

Papers of the process level of analysis group anticipate business process as a tool designed to generate performance providing an output. Business process research is focused on finding the characteristics of a process that enable the achievement of process operational goal in most efficient way. Characteristics of process correctness, process user's compliance are related to the opportunities that enable performance development. However, characteristics of process weakness, complexity, uncertainty are related to threats to fail to achieve the goals of the process. Knowledge of the conditions and assumptions for these features provides opportunities for better management of processes.

Generalized process investigation direction distinguished in relation to the second research question:
Improvement of the process as a tool intended to generate performance (N=24).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

Generalized process investigation directions were distinguished:

- Relationship between performance of the process and the performance of the business (N=3)
- Improvement of the process performance impact on business performance (N=8)
- Business process performance measurement (N=13)
-

Relationship between performance of the process and the performance of the business

Papers of the intra-organizational level of analysis group are based on the view that the preconditions for improving the process relate to the process features enabling to achieve the goals of the organization in the optimal way. Options and prerequisites to improve the process are discovered by linking the characteristics of the process or process design with the measures of organizations' goals. This mode of research postulates the idea that there is direct connection between operation of the process and operation of the business. Therefore, improvement of the process performance leads to business performance improvement.

Improvement of the process performance impact on business performance

The assumptions for improving the process are determined by detailed analysis of the process's structure and performance in relation to the objectives of the process. Process model design and performance is the main focus in these studies. Recent research in this research stream emphasizes the problem of the process as a dynamic system capable of generating changes in the response to environmental factors, as well as enabling automatic operation of the process.

Business process performance measurement

Papers of the intra-organizational level of analysis group also focus on the issues of business process performance measurement. This mode of research postulate the ideas that the proper measurement system can influence the operation of the process; the framework for the measurement of process performance must be consistent with the objectives of the process and organization and in that way it will generate the impact on business outcomes, suitable indicators and metrics to measure business process performance should be consistent with process and business goals.

Generalized process investigation direction was distinguished in relation to the second research question:
Business process as part of value chain (N=3).

Papers of the inter-organizational level of analysis group of process studies explore the concept of business process alignment within the product value chain, emphasizing the business process interactions in the inter-organizational mode. Also outsourcing is the object of research that analyzes methods to facilitate process outsourcing decision-making.

7. Exploratory potential areas for future inquiry

Process analysis is continuous activity of process management as business enterprise continuously adapt to dynamic environment in which it operates. Measures, metrics for business process performance and techniques for business process data gathering and monitoring are known (Van Looy, Shafagatova, 2016; Vergidis et al., 2008; Gonzalez et al., 2010). Also some papers provide the analysis of environmental implications to the technological processes and process performance measurement from the supply chain perspective (Sarkis et al., 2006; Morgan, 2004). However, proper evaluation of business processes need complex data on business

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

operations's context or environment, such as customer needs and satisfaction, organization competitiveness, data of resource markets, environmental implications on process performance. Business operation's environment data are supplied by the means of transactions and communication with customers, suppliers, stakeholders, competitors. From the point of view of process analysis these channels of information usually are not created in consistent mannier (data, data requirements lack of consistency), therefore, it is limited availability of data integration, tracking, monitoring and forecast the effects of various factors of environment on business operations. Future research on business process analysis should be directed towards the search of systems, procedures and techniques designed to ensure and manage the flow of external information and to integrate this information in the business process management systems. As the potential area of future enquiry, the integration of external and internal information is significant due to its support to the improvement of the process and business performance, based on more comprehensive knowledge of the consumers' and other stakeholders' needs.

Business process design and reengineering projects' implementation do not always successfully provide the projected results and always it is a risk that the project will fail or that sufficient performance will not be achieved. Analysis of the literature provides some insight of the limitation in deeper analysis for the risk management processes (1 table). Due to the complexity of the process systems and diversity of the risk effects and risk factors, the risk management process modeling should ensure the integration of activities for the management of a-priori risk and emergent risk factors.

Development of complex production processes, innovative business practices and the growing experience of the participants of the process create prerequisites for the implementation of intensive knowledge-based operating processes. These intensive knowledge-based processes are different from the production processes. The most significant difference is in the nature of the interaction between the participants involved in the process and the process systems. Knowledge-based processes require implementing flexible interactions and high variability workflow design; however, this type of interaction is not profoundly studied.

An approach to integrate the customer into the product lifecycle processes is considered relevant. Although, customer involvement in product design and development processes is related to the problem of user engagement and manufacturer control uncertainty. The modes of customer involvement in the process, effective control of customer actions and efficient management of overall process with the customer are of interest for future research. Customer participation in business processes is also relevant in service settings. Although, business process development in service industries provided some knowledge on the enablers of high customer value, development of efficiently operating models of the process of interaction between enterprise and its customers is not deeply investigated.

Conclusions

Structured analysis of scientific literature revealed the levels of research of business processes and the main directions of research. Conceptualization of research on business process analysis issues enable to capture three levels of analysis – process level, intra-organizational level and intra-organizational level. The main trends of business process analysis research at the process level is related to the search for knowledge that enables business theorists and practitioners to know the process properties, elements and types, as well as to improve the process as a tool intended to generate performance. The main streams of research at the intra-organizational level capture the issues of the relationship between performance of the process and performance of the business, business process performance measurement and improvement of the process performance impact on business performance. Studies emphasizing process analysis at the inter-organizational level focus on process alignment within the product value chain and process interactions in the inter-organizational mode.

Structured literature review has enabled to distinguish the relevant but less investigated issues of business process performance and to identify exploratory potential areas for future inquiry. The importance of these studies is emphasized: external information management processes and the integration of external information into process management, development and management of specific processes such as risk, knowledge creation and knowledge based processes, user involvement in business processes.

References

Aguilar-Saven R.S. 2004. Business process modelling: Review and framework, *International Journal of Production Economics*. 90: 129–149. http://dx.doi/10.1016/S0925-5273(03)00102-6

Anttila, J.; Jussila, K. 2013. An advanced insight into managing business processes in practice, *Total Quality Management* 24(8): 918–932. Retrieved from http://dx.doi/10.1080/14783363.2013.791105

Boellt, S.K.; Cecez-Kecmanovic, D. 2015. On being 'systematic' in literature reviews in IS, *Journal of Information Technology* 30:161–173. http://dx.doi/10.1057/jit.2014.26

Curtis, B.; Kellner, M.I.; Over J. 1992. Process modeling, *Communications of the ACM* September 35(9): 75-90. Retrieved from https://doi.org/10.1145/130994.130998

Davenport, T.H.; Short J.E. 1990. The new industrial engineering: information technology and business process redesign, *Sloan Management Review* 31 (4): 11-27.

Davenport, T.H. 1993. *Process Innovation: Re-engineering Work through Information Technology*. Boston, MA: Harvard Business School Press.

Dumas, M.; La Rosa, M.; Mendling, J.; Reijers, H.A. 2013. Fundamentals of Business Process Management. Heidelberg: Springer. http://dx.doi/10.1007/978-3-642-33143-5

Hammer, M.; Champy, J. 1993. *Reengineering the Corporation: A Manifesto for Business Revolution*. New York: Harper Business.

Irani, Z.; Hlupic, V.; Giaglis, G.M. 2002. Business process reengineering: An analysis perspective, *International Journal of Flexible Manufacturing Systems* 14: pp. 5–10. Retrieved from https://doi.org/10.1023/A:1013868430717

Khosravi, A. 2016. Business process rearrangement and renaming: A new approach to process orientation and improvement, *Business Process Management Journal* 22(1): 116-139. Retrieved from https://doi.org/10.1108/BPMJ-02-2015-0012

Laakso, T. 1997. *Process Assessment Method — an approach for business process development*. In: Plonka F., Olling G. (eds) Computer Applications in Production and Engineering. IFIP — The International Federation for Information Processing. Boston, MA: Springer. Retrieved from https://doi.org/10.1007/978-0-387-35291-6_21

Van der Aalst, W.M.P. (2004). Business process management: a personal view, *Business Process Management Journal* 10(2), Retrieved from https://doi.org/10.1108/bpmj.2004.15710baa.001

Appendix 1.
The list of sampled papers (N=62)

1. Abu Rub, F. A.; Issa, A.A. 2012. A business process modeling-based approach to investigate complex processes: Software development case study, *Business Process Management Journal* 18(1): 122-137. Retrieved from https://doi.org/10.1108/14637151211215046

2. Alfaro, J. J.; Rodriguez-Rodriguez, R.; Verdecho, M.J.; Ortiz, A. 2009. Business process interoperability and collaborative performance measurement, *International Journal of Computer Integrated Manufacturing* 22(9): 77–889. Retrieved from http://dx.doi.org/10.1080/09511920902866112

3. Anastassiu, M.; Santoro, F. M.; Recker, J.; Rosemann, M. 2016. The quest for organizational flexibility: Driving changes in business processes through the identification of relevant context, *Business Process Management Journal* 22(4): 763-790, Retrieved from https://doi.org/10.1108/BPMJ-01-2015-0007

4. Andersson, B.; Bider, I.; Johannesson, P.; Perjons, E. 2005. Towards a formal definition of goaloriented business process patterns, *Business Process Management Journal* 11(6): 650-662. Retrieved from https://doi.org/10.1108/14637150510630846

5. Bækgaard, L. 2009. Event-based conceptual modeling, *Business Process Management Journal* 15(4): 469-486. Retrieved from https://doi.org/10.1108/14637150910975499

6. Berente, N.; Vandenbosch, B.; Aubert, B. 2009. Information flows and business process integration, *Business Process Management Journal* 15(1): 119-141. Retrieved from https://doi.org/10.1108/14637150910931505

7. Bergener, P.; Delfmann, P.; Weiss, B.; Winkelmann, A. 2015. Detecting potential weaknesses in business processes: An exploration of semantic pattern matching in process models, *Business Process Management Journal* 21(1): 25-54. Retrieved from https://doi.org/10.1108/BPMJ-07-2013-0103

8. Bisogno, S.; Calabrese, A.; Gastaldi, M.; Levialdi Ghiron, N. 2016. Combining modelling and simulation approaches: How to measure performance of business processes, *Business Process Management Journal* 22(1): 56-74. Retrieved from https://doi.org/10.1108/BPMJ-02-2015-0021

9. Bocciarelli, P.; D'Ambrogio, A. 2014. A model-driven method for enacting the design-time QoS analysis of business processes, *Software System Model Journal* 13: 573–598. http://dx.doi/10.1007/s10270-013-0345-5

10. Bolsinger, M.; Elsäßer, A.; Helm, C.; Röglinger, M. 2015. Process improvement through economically driven routing of instances, *Business Process Management Journal* 21(2): 353-378. Retrieved from https://doi.org/10.1108/BPMJ-02-2014-0011

11. Bosch-Mauchand, M.; Belkadi, F.; Bricogne, M.; Eynard, B. 2013. Knowledge-based assessment of manufacturing process performance: integration of product lifecycle management and value-chain simulation approaches, *International Journal of Computer Integrated Manufacturing* 26(5): 453-473. Retrieved from http://dx.doi.org/10.1080/0951192X.2012.731611

12. Bouchbout, K.; Akoka, J.; Alimazighi, Z. 2012. An MDA-based framework for collaborative business process modelling, *Business Process Management Journal* 18(6): 919-948. Retrieved from https://doi.org/10.1108/14637151211283357

13. Cadden, T.; Downes, S.J. 2013. Developing a business process for product development, *Business Process Management Journal* 19(4): 715-736. Retrieved from https://doi.org/10.1108/BPMJJan-2012-0006

14. Cardoso, J. 2008. Business Process Control-Flow Complexity: Metric, Evaluation, and Validation, International Journal of Web Services Research 5(2): 49-76.

15. Chin, H. G.; Zameri Mat Saman, M. 2004. Proposed analysis of performance measurement for a production system, *Business Process Management Journal* 10(5): 570-583. Retrieved from https://doi.org/10.1108/14637150410559234

16. Climent, C.; Mula, J.; Hernández, J.E. 2009. Improving the business processes of a bank, *Business Process Management Journal* 15(2): 201-224. Retrieved from https://doi.org/10.1108/14637150910949452

17. Corradini, F.; Polini, A.; Re, B. 2015. Inter-organizational business process verification in public administration, *Business Process Management Journal* 21(5): 1040-1065. Retrieved from https://doi.org/10.1108/BPMJ-02-2014-0013

18. Coskun, S.; Basligil, H.; Baracli, H. 2008. A weakness determination and analysis model for business process improvement, *Business Process Management Journal* 14(2): 243-261. Retrieved from https://doi.org/10.1108/14637150810864961

19. Dallavalle de Pádua, S.I.; Chiappetta Jabbour, C.J. 2015. Promotion and evolution of sustainability performance measurement systems from a perspective of business process management: From a literature review to a pentagonal proposal, *Business Process Management Journal* 21(2): 403-418. Retrieved from https://doi.org/10.1108/BPMJ-10-2013-0139

20. Dallavalle de Pádua, S.I.; Hornos da Costa, J.M.; Segatto, M.; Aparecido de Souza Júnior, M.; Chiappetta Jabbour, C.J. 2014. BPM for change management: two process diagnosis techniques, *Business Process Management Journal* 20(2): 247-271. Retrieved from https://doi.org/10.1108/BPMJ-03-2013-0039

21. Darmani, A.; Hanafizadeh, P. 2013. Business process portfolio selection in re-engineering Projects, *Business Process Management Journal* 19(6): 892-916. Retrieved from https://doi.org/10.1108/BPMJ-08-2011-0052

22. Davamanijaran, P.; Kaufmann, R. J.; Kriebel, C. H.; Mukhopadghay, T. 2006. Systems Design, Process Performance, and Economic Outcomes in International Banking, *Journal of Management Information Systems* 23(2): 65–90. Retrieved from https://doi.org/10.2753/MIS0742-1222230204

23. Dervitsiotis, K.N. 1999. How to attain and sustain excellence with performance-based process management, *Total quality management* 10 (3): 309-326.

24. Espino-Rodríguez, T.F.; Rodríguez-Díaz, M. 2014. Determining the core activities in the order fulfillment process: an empirical application, *Business Process Management Journal* 20(1): 2-24. Retrieved from https://doi.org/10.1108/BPMJ-01-2013-0012

25. Franceschini, F.; Galetto, M.; Turina, E. 2013. Techniques for impact evaluation of performance measurement systems, *International Journal of Quality & Reliability Management* 30(2): 197 – 220. Retrieved from http://dx.doi.org/10.1108/02656711311293599

26. González, L.S.; Rubio, F.G.; González, R.F.; Velthuis, M.P. 2010. Measurement in business processes: a systematic review, *Business Process Management Journal* 16(1): 114-134. Retrieved from https://doi.org/10.1108/14637151011017976

27. Hachicha, M.; Fahad, M.; Moalla, N.; Ouzrout, Y. 2016. Performance assessment architecture for collaborative business processes in BPM-SOA-based environment, *Data & Knowledge Engineering* 105: 73–89. Retrieved from http://dx.doi.org/10.1016/j.datak.2015.12.002

28. Hadasch, F.; Maedche, A.; Gregor, S. 2016. The influence of directive explanations on users' business process compliance performance, *Business Process Management Journal* 22(3): 458-483. Retrieved from https://doi.org/10.1108/BPMJ-05-2015-0067

29. Hanafizadeh, P.; Rezaei, M.; Ghafouri, A. 2009. Defining strategic processes in investment companies: An exploration study in Iranian Investment Companies, *Business Process Management Journal* 15(1): 20-33. Retrieved from https://doi.org/10.1108/14637150910931442

30. Helquist, J.H.; Cox, J.J.; Walker, A. 2009. Exploring diverse process and team alternatives through virtual process simulation, *Business Process Management Journal* 15(5): 633-652. Retrieved from https://doi.org/10.1108/14637150910987883

31. Helquist, J.H.; Deokar, A.; Cox, J.J.; Walker, A. 2012. Analyzing process uncertainty through virtual process simulation, *Business Process Management Journal* 18(1): 4-19. Retrieved from https://doi.org/10.1108/14637151211214984

32. Jarrar, Y. 2004. Performance measurement in the 21st century: From performance measurement to performance management, *Business Process Management Journal* 10(5). Retrieved from https://doi.org/10.1108/bpmj.2004.15710eaa.001

33. Khan, M.K.; Wibisono, D. 2008. A hybrid knowledge-based performance measurement system, *Business Process Management Journal* 14(2): 129-146. Retrieved from https://doi.org/10.1108/14637150810864899

34. Kohlbacher, M. 2010. The effects of process orientation: a literature review, *Business Process Management Journal* 16(1): 135-152. Retrieved from https://doi.org/10.1108/14637151011017985

35. Kohlbacher, M.; Gruenwald, S. 2011. Process orientation: conceptualization and Measurement, *Business Process Management Journal* 17(2): 267-283. Retrieved from https://doi.org/10.1108/14637151111122347

36. Lee, S.M.; Olson, D.L.; Trimi, S.; Rosacker, C.M. 2005. An integrated method to evaluate business process alternatives, *Business Process Management Journal* 11(2): 198-212. Retrieved from https://doi.org/10.1108/14637150510591183

37. Li, J.; Fan, Y.; Zhou, M. 2004. Performance Modeling and Analysis of Workflow, *IEEE Transactions on Systems, Man, And Cybernetics – Part A: Systems and Humans* 34(2): 229-242. Retrieved from http://dx.doi.org/0.1109/TSMCA.2003.819490

38. McCormack, K.; Rauseo, N. 2005. Building an enterprise process view using cognitive mapping, *Business Process Management Journal* 11(1): 63-74. Retrieved from https://doi.org/10.1108/14637150510578737

39. Morgan, C. 2004. Structure, speed and salience: performance measurement in the supply chain, *Business Process Management Journal* 10(5): 522-536. Retrieved from https://doi.org/10.1108/14637150410559207

40. Najmi, M.; Rigas, J.; Fan, IS. 2005. A framework to review performance measurement systems, *Business Process Management Journal* 11(2): 109-122. https://doi.org/10.1108/14637150510591129

41. Nestic, S.; Djordjevic, A.; Puskaric, H.; Zahar Djordjevic, M.; Tadic, D.; Stefanovic, M. 2015. The evaluation and improvement of process quality by using the fuzzy sets theory and genetic algorithm approach, *Journal of Intelligent & Fuzzy Systems* 29: 2017–2028. Retrieved from http://dx.doi.org/10.3233/IFS-151679

42. Nicholds, B.A.; Mo, J.P.T. 2016. Estimating performance from capabilities in business process improvement, *Business Process Management Journal* 22(6): 1099-1117. Retrieved from https://doi.org/10.1108/BPMJ-09-2015-0129

43. Pun, K.I.; Si, Y. W.; Pau, K. C. 2012. Key performance indicators for traffic intensive web-enabled business processes, *Business Process Management Journal* 18(2): 250-283. Retrieved from https://doi.org/10.1108/14637151211225199

44. Quesada, H.; Gazo, R. 2007. Methodology for determining key internal business processes based on critical success factors: A case study in furniture industry, *Business Process Management Journal* 13(1): 5-20. Retrieved from https://doi.org/10.1108/14637150710721104

45. Regev, G.; Alexander, I.F.; Wegmann, A. 2005. Modelling the regulative role of business processes with use and misuse cases, *Business Process Management Journal* 11(6): 695-708. Retrieved from https://doi.org/10.1108/14637150510630864

46. Robson, I. 2004. From process measurement to performance improvement, *Business Process Management Journal* 10(5): 510-521. Retrieved from https://doi.org/10.1108/14637150410559199

47. Samaranayake, P. 2009. Business process integration, automation, and optimization in ERP: Integrated approach using enhanced process models, *Business Process Management Journal* 15(4): 504-526. Retrieved from https://doi.org/10.1108/14637150910975516

48. Samaranayake, P.; Dadich, A.; Hayes, K. J.; Sloan, T. 2015. Patient-journey modelling and simulation in computed tomography: An integrated framework, *Business Process Management Journal* 21(5): 988-1014. Retrieved from https://doi.org/10.1108/BPMJ-10-2014-0097

49. Sarkis, J.; Meade, L.; Presley, A. 2006. An activity based management methodology for evaluating business processes for environmental sustainability, *Business Process Management Journal* 12(6): 751-769. Retrieved from https://doi.org/10.1108/14637150610710918

50. Shang, S.S.C.; Wu, YL. 2013. Measuring process capital from a system model perspective, *Business Process Management Journal* 19(4): 662-679. Retrieved from https://doi.org/10.1108/BPMJ-11-2012-0117

51. Solaimani, S.; Bouwman, H. 2012. A framework for the alignment of business model and business processes: A generic model for trans-sector innovation, *Business Process Management Journal* 18(4): 655-679. Retrieved from https://doi.org/10.1108/14637151211253783

52. Torres, R.; Sidorova, A. 2015. The effect of business process configurations on user motivation, *Business Process Management Journal* 21(3): 541-563. Retrieved from https://doi.org/10.1108/BPMJ-09-2013-0131

53. Valiris, G.; Glykas, M. 2004. Business analysis metrics for business process redesign, *Business Process Management Journal* 10(4): 445-480. Retrieved from https://doi.org/10.1108/14637150410548100

54. Van Loy, A.; Shafagatova, A. 2016. Business process performance measurement: a structured literature review of indicators, measures and metrics, *SpringerPlus* (2016) 5:1797. https://doi.org/10.1186/s40064-016-3498-1

55. Vergidis, K.; Tiwari, A.; Majeed, B. 2008. Business Process Analysis and Optimization: Beyond Reengineering, *IEEE Transactions on systems, man, and cybernetics. Part C: applications and reviews*. https://doi.org/10.1109/TSMCC.2007.905812

56. vom Brocke, J.; Recker, J.; Mendling, J. 2010. Value-oriented process modeling: integrating financial perspectives into business process re-design, *Business Process Management Journal* 16(2): 333-356. Retrieved from https://doi.org/10.1108/14637151011035633

57. Wieland, U.; Fischer, M.; Pfitzner, M.; Hilbert, A. 2015. Process performance measurement system – towards a customer-oriented solution, *Business Process Management Journal* 21(2): 312-331. Retrieved from https://doi.org/10.1108/BPMJ-04-2014-0032

58. Wu, L.; Park, D. 2009. Dynamic outsourcing through process modularization, *Business Process Management Journal* 15(2): 225-244. Retrieved from https://doi.org/10.1108/14637150910949461

59. Wynn, M.T.; Verbeek, H.M.W.; van der Aalst, W.M.P.; ter Hofstede, A.H.M.; Edmond, D. 2009. Business process verification – finally a reality!, *Business Process Management Journal* 15(1): 74-92. Retrieved from https://doi.org/10.1108/14637150910931479

60. Yen, V.C. 2009. An integrated model for business process measurement, *Business Process Management Journal* 15(6): 865-875. Retrieved from https://doi.org/10.1108/14637150911003757

61. Yu, Y.; Pelaez, A.; Lang, K.R. 2016. Designing and evaluating business process models: an experimental approach, *Information Systems and e-Business Management* 14: 767–789. Retrieved from http://dx.doi.org/10.1007/s10257-014-0257-0

62. Zhu, X.; Recker, J.; Zhu, G.; Santoro, F.M. 2014). Exploring location-dependency in process modeling, *Business Process Management Journal* 20(6): 794-815. Retrieved from https://doi.org/10.1108/BPMJ-06-2013-0066

Appendix 2. Business process attributes, elements and references (N=17)

Method and purpose of process analysis		Findings of the process analysis	Analysis techniques
Bekgaard, 2009	Event-based conceptual modeling designed to improve process modeling	Guidelines for creation dynamic and static models of business process	
Bergener et al., 2015	Approach designed to facilitate the detection of pattern-based process weakness	Provided tools for automated detection of process weaknesses applying the pattern matching approach	Argumentative reasoning, literature analysis, conceptual modeling, interview
Bouchbout et al., 2012	Framework for modeling collaborative processes	Identified properties of collaborative processes, defined a set of business, process and technical transformation rules, proposed a generic collaborative business process meta-model	Model drive architecture, Business process modeling notation
Cadden, Downes, 2013	Model of high level business process designed to enable supplier integration within the product development	Developed an early supplier involvement business process	Case analysis
Cardoso, 2008	Developed measure to analyze the control-flow complexity of business processes	Introduced control-flow complexity measure qualified as comprehensive and validated	Weyuker method for the evaluation of the metric, experiment for empirical validation of the metric
Climent et al., 2009	Identification and	Detected the descriptive and	Flow diagram technique,

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

	improvement of critical processes in the bank setting	graphical view of the critical processes of a bank.	integrated definitions technique, structured modeling
Corradini et al., 2015	Business process correctness analysis, based on formal unfolding method	Identified risky unti-pattern interactions in the process execution	Business process modeling notation, Petri Net
Dervitsiotis, 1999	Systematic approach for selecting critical processes	Identify value adding contributions of the process	Riggs matrix for combining the measures of different units
Hadasch et al., 2016	Developed concept of directive explanation, designed to provide context-dependent feedback to the user of process IT systems	Conceptualized and designed directive explanation tool for the users to follow process tasks; provided the evidence of the impact of directive explanations on the process compliance performance	Laboratory experiment, logistic regression method for data analysis
Hanafizadeh et al., 2009	Methodology for selecting strategic processes in the setting of investment enterprise, based on the Balanced Scorecard framework and the statistical analysis	Identified strategic processes of investment enterprise	Balanced Scorecard framework, statistical analysis, questionnaire survey
Helquist et al., 2012	Developed technique for process uncertainty identification and analysis	Process deployment alternatives measured by aggregated scores in regard to inherent risks and opportunities	Multiple criteria decision analysis, virtual process simulation, business process modeling
Najmi, 2005	Framework for performance measurement system review designed to facilitate the procedures of reviewing business performance and performance measurement system	Designed process of reviewing, identified activities, people, tools and expected outputs	Literature analysis, technique of review card
Quesada, Gazo, 2007	Methodology designed to determine and rank key internal business processes in relationship to critical success factors;	Developed critical success factors for manufacturing enterprises and defined critical internal processes	Balanced scoreboard procedure, prioritization matrix
Regev et al., 2005	Framework for business process classification; and theoretical justification of "Use and misuse cases" technique for modeling the value creation and abuse preventions activities	Regulative process activities to mitigate of the explicit threat from the misuse cases are introduced	Process modeling
Shang, Wu, 2013	Method for measuring operational and managerial performance of process capital	Identified indicators for the value of process capital	Hierarchical regression analysis
Solaimani, Bouwman, 2012	Conceptual framework of business model and business process alignment	Identified generic inter-organizational and intra-organizational interaction components	Literature analysis
Torres, Sidorova, 2015	Process configuration features, such as process rules complexity, work backlog,	Provided the evidence of the work setting effect on employees motivation	Experiment, questionnaire survey

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

	and case distribution method, evaluated in regard to the impact on motivation of process participants		

Appendix 3. Frameworks, methods and techniques for business process analysis (N=51)

Method and purpose of process analysis		Findings of the process analysis	Analysis techniques	Generalized process investigation directions in relation to the research question
Abu Rub, Issa, 2012	Developed approach to exploring complex processes using business process modeling	Introducing of role activity diagrams to be used for business process modeling in the software development application domain	Case study	Improvement of the process as a tool intended to generate performance
Alfaro et al., 2009	Defined core criteria characteristics for performance measurement systems, which cover business process interoperability requirements	Identified characteristics of performance measurement systems to tackle business processes interoperability	Literature review	Business process performance measurement
Anastassiu et al., 2016	Procedural guide for analyzing business process ontological transactions in order to identify context information relevant to process	Identified attributes impacting the goal of the process; elements of the immediate/internal context are considered as attributes	Business process modeling, questionnaire survey to identify the essential activities of a process, ontological transaction matrix for identification of an ontological transaction	Improvement of the process as a tool intended to generate performance
Andersson et al., 2005	Method of definition of best practice business process pattern designed for comparison with the process	Proposed method aimed to define process pattern designed to be used for a re-engineering of the process	State-flow common method for business modelling is used to determine the process pattern	Improvement of the process as a tool intended to generate performance
Berente et al., 2009	Principles of process integration	Identified generalized activities that describe common non-integrated behavior	Literature analysis, field studies	Business process as part of value chain
Bergener et al., 2015	"Pattern-based approach for automatically detecting potential process weaknesses in semantic process models" (Bergener et al., 2015, p.25)	Process weaknesses identified automatically due to application of process weakness patterns to semantic process models.	Generic model query language, design science research process to combine, apply and evaluate IT artifacts	Improvement of the process as a tool intended to generate performance
Bisogno et al., 2016	Method, based on Business Process Modeling and Notation and Business Process Simulation, designed to measure key performance indicators of the process and to test potential process improvements	Identified process weaknesses and possible corrective actions	Business Process Modeling and Notation, Business Process Simulation techniques, what-if analysis	Improvement of the process as a tool intended to generate performance
Bocciarelli, D'Ambrogio, 2014	Model-driven method, that exploits performability enabled BPMN, designed to enact automated analysis of	Provide the availability to predict process behavior	Standard BPMN meta-model enriched with Real Time Embedded System (MARTE), used for description of process	Improvement of the process as a tool intended to generate performance

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

	business process behavior (o to predict the performance and the reliability of a business process, either to select the process configuration that provides the best behavior or to check if a given configuration satisfies the overall requirements)		performance attributes and expanded with additional contributions that add the description of reliability properties, reliability of process is considered in term of faults and failures that may affect the process execution	
Bolsinger et al., 2015	Decision model that determines the routing of the instances of the process in a way that ensures maximum value contribution to the process	Determined parameters that maximizes the expected cash flow of the process	Business process modeling, scoring system for the estimation of risk level	Improvement of the process as a tool intended to generate performance
Bosch-Mauchand et al., 2013	Method and tools designed to evaluate manufacturing enterprise processes in terms of performance and value indicators based on knowledge management integration	Product life-cycle management – knowledge management framework for automated assessment of enterprise performance	Analytic hierarchy process technique used for constructing a value indicator	Improvement of the process as a tool intended to generate performance
vom Brocke, 2010	Value-oriented approach to business process modeling	Framework designed to integrate financial information into process re-design.	Balanced scorecard approach	Improvement of the process as a tool intended to generate performance
Chin, Saman, 2004	Method designed to identify performance measures for quantitative analysis and selection of production system	Performance rating for each production system are calculated	Questionnaire survey technique (based on manufacturing outputs of cost, quality, performance, delivery, flexibility, innovativeness) was used for the identification of performance measure	Business process performance measurement
Corradini et al., 2015	Approach for the assessment of inter-organizational business processes' structural properties in public administrations domain	Explored the possibilities of formal verification techniques in order to assess the properties of business process models	Business process model defined by Business Process Model and Notation is transformed to Petri Net standard, verification of derived process in terms of desired properties is carried out using net unfolding approach	Improvement of the process as a tool intended to generate performance
Coskun et al., 2008	Model designed to determine and analyze the weak points of the process and reducing the weakness degrees	Developed a tool intended to facilitate decision making	Analytic hierarchy process methodology, goal programming, linear programming	Improvement of the process as a tool intended to generate performance
Darmani, Hanafizadeh, 2013	Methodology for business process portfolio selection, designed to support the selection of the processes for process reengineering (BPR).	Proposed methodology aims to identify the process, achieving lower risk and higher probability of success for BPR projects.	BSC method for selection of strategic processes, questionnaire survey of experts for the evaluation of importance of each process, perceived degree of change, and also for the evaluation of risk and return for BPR project and BPR scenario, multiple criteria decision making method for process	Improvement of the process performance impact on business performance

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

			ranking, technique for order preference by similarity to ideal solution (TOPSIS) for prioritizing the processes	
Davamanirajan et al., 2006	Process performance model designed to assess the effect of process' IT system on the process output and quality; economic performance model designed to link process performance with the firm's performance	Elements of the process performance model and economic performance model are defined, Trade services process model variables identified	OLS regression for the estimation of model equations	Improvement of the process as a tool intended to generate performance
Dervitsiotis, 1999	Method for selecting critical processes with the greatest impact on organizations goals	Assessment of weighted process contribution score and ranking of the processes in terms of total weighted contribution	Weighted performance level calculation method to assess the weighted process contribution reflecting the impact of the process to strategic goal, Riggs matrix applied for transformation of process performance measures to common numerical performance scale	Improvement of the process performance impact on business performance
Espino-Rodriguez, Rodriguez-Diaz, 2014	Methodology designed to identify operations that generate core competences within the supply chain process	Identified operations in terms of their ability to be a source of competitive advantage	Supply chain operations reference model, questionnaire survey, structural equation modelling	Improvement of the process performance impact on business performance
Franceschini et al., 2013	Methodology designed to evaluate the impact of performance measurement system on the organization performance	Proposed impact reference model, based on the balance scorecard framework	A series of case studies applied for the evaluation of the sets of performance indicators	Improvement of the process performance impact on business performance
Gonzalez, 2010	Generalization of the trends in research on business process measurement		Systematic literature review	Business process performance measurement
Hachicha et al., 2016	Analysis and assessment approach for collaborative business processes in the service-oriented architecture	Proposed method to track the execution of collaborative business process and to analyse the performance trajectory of a business process regarding the business performance level	Business process modeling notation for process structuring, KPIs for business performance goal measurement, reference analysis framework for measurement of technical indicators	Connection between the performance of the process and the performance of the business
Hadasch et al., 2016	Concept of directive explanations to the user of the process' information system so that the individual user complies with the process	The influence of directive explanations to the users' compliance performance is confirmed by the experiment	Laboratory experiment to test user's process compliance performance	Improvement of the process as a tool intended to generate performance
Helquist et al., 2009	Development of virtual process simulation technique for modeling process alternatives	Process modeling method developed	Business process developing	Improvement of the process as a tool intended to generate performance
Khan, Wibisono, 2008	Knowledge-based performance measurement system	Developed measurement system covering various perspectives of company performance: business perspective, customer perspective,	Analytic hierarchy process methodology, gap analysis	Business process performance measurement

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

		manufacturing competitive priorities perspective, internal process s perspective and resource and method availability perspective		
Kohlbacher, 2010	Literature review of studies of the influence of the process orientation on organizational performance		Literature review	Connection between the performance of the process and the performance of the business
Kohlbacher, Gruenwald, 2011	Model to measure the key dimensions of the process orientation construct	Developed multidimensional construct of process orientation	Literature review, factor analysis	Connection between the performance of the process and the performance of the business
Lee et al., 2005	"Method for evaluation of business process alternatives focusing on demand chain needs" (Lee et al., 2005, p.198)	Evaluated expected impact of the alternatives considering all criteria, on which alternatives are being compared	Multiple criteria analysis	Improvement of the process performance impact on business performance
Li, Zhou, 2004	Framework for workflow modeling and analysis	Provided solution for the automatic analysis of workflow	Generalized stochastic Petri Net modeling tool is used to model workflow, multidimensional workflow net was developed for the framework	Improvement of the process as a tool intended to generate performance
van Looy, Shafagatova, 2016	Literature review aims to find patterns or trends in the research on business process performance measurement. Provide an extended list of 140 process-related performance indicators in a systematic manner by further categorizing them into 11 performance perspectives, distinguish between models focusing on the entire business and models of single process	Structured literature review	Meta study method, structured literature review based on bibliometric type of content analysis	Business process performance measurement
McCormack, Rauseo, 2005	Method for aligning business strategy to process strategy and design by using cognitive mapping techniques and principles of modularity	Proposed method for developing high-level business process orientation, defined a generic high level process map, identified process types	Cognitive mapping and principles of modularity	Improvement of the process performance impact on business performance
Morgan, 2004	Paper aims to assess performance measurement in supply chain and provide insights for improving supply chain performance measurement	Literature analysis Identified requirements for supply chain performance measurement system	Literature analysis	Business process performance measurement
Nestic et al., 2015	Fuzzy model for evaluation and improvement of process quality	Developed solution for process quality assessment	genetic algorithm approach applied for solution development, fuzzy pair-vice comparison matrices technique used for calculation of fuzzy ratings of key performance indicators	Improvement of the process as a tool intended to generate performance

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

Nichlods, Mo, 2016	Proposed method aims to indicate a link between the improvement capability of an organization and the intensity of effort applied to a business process improvement (BPI) project	Function that estimates the applicable effort expressed as regression function of current organization's improvement capability	Defined capability factor hierarchal structure, relationship between capability to the effectiveness and performance to effectiveness approximated by regression analysis	Improvement of the process performance impact on business performance
de Padua et al., 2014	Comparative analysis of methods of process modeling and root cause analysis in the application for diagnostics of information management process	Recommendations for applying the methods in process analysis practice	Business process modeling notation technique applied for process modeling, current reality tree technique applied for root cause analysis, experiment for the testing of process diagnosis techniques	Improvement of the process as a tool intended to generate performance
Padua et al., 2015	Conceptual recommendations for the development of sustainability performance measurement system based on business process perspective		Literature review	Business process performance measurement
Pun et al., 2012	Approach for analyzing key performance indicators of traffic intensive web-enabled business processes based on internal and external view of performance	Key performance indicators of traffic intensive web-enabled business processes identified	Audit trail analysis, stress testing, workflow schema	Business process performance measurement
Robson, 2004	Criteria for the evaluation of process measurement systems in relation to potential of the process performance measurement system to induce the process performance improvement	Provide the steps for the development of unified measurement approach to improving process performance	Analysis and synthesis of literature sources	Business process performance measurement
Samaranayake, 2009	Framework of integrated approach to business process modeling	Developed framework, based on process integration for functional applications, automation for business workflows, and additional functionalities for process optimization, was applied to the enterprise resource planning processes	Event-driven process chain methodology	Improvement of the process as a tool intended to generate performance
Samaranayake et al., 2015	Business process reengineering framework for process evaluation and the improvement of patient flow in health care setting	Identified key process variables, modelled simulating patient flow	Mathematical modelling, simulation	Improvement of the process as a tool intended to generate performance
Sarkis et al., 2006	Methodology for business process evaluation, covering the environmental implications of technological processes	Final aggregate and normalized environmental consumption score (TPI), calculated for each process, define which alternative process or	Activity based costing technique, analytic hierarchy process, business process modeling	Business process performance measurement

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

		technology is more economically and environmentally sound		
Solaimani, Bouwman, 2012	Conceptual framework of business model and business process alignment	Identified generic inter-organizational and intra-organizational interaction components	Literature analysis	Business process as part of value chain
Torres, Sidorova, 2015	The effect of business process configuration on process participant's motivation	Business process configuration, determined by business process rules complexity, work backlog, and case distribution method, influence motivation through the effect of perceived competence	Experiment, questionnaire survey	Improvement of the process as a tool intended to generate performance
Valiris, Glykas, 2004	Explores Agent relationship morphism analysis framework for business analysis, inclusive structural, behavioral and process perspectives		Different analysis techniques from various disciplines are included in Agent relationship morphism analysis	Improvement of the process performance impact on business performance
Vergidis et al., 2008	Classification of business process modeling techniques in terms of process analysis and optimization		Literature review	Improvement of the process as a tool intended to generate performance
Wieland et al., 2015	Conceptual recommendations for the development of process performance measurement system based on customer oriented solution		Literature review	Business process performance measurement
Wu, Park, 2009	Dynamic outsourcing framework for making and implementing process outsourcing decisions	Developed theoretical framework intended to improve outsourcing activities at the operational level	Literature review	Business process as part of value chain
Wynn et al., 2009	Verification techniques designed to assess correctness of business process models	Developed process verification techniques	Workflow language yet another workflow language (YAWL)	Improvement of the process as a tool intended to generate performance
Yarrar, 2004	Tendencies of performance measurement development explored		Analysis and synthesis of literature sources	Business process performance measurement
Yu et al., 2016	Experimental approach to compare the alternatives of business process designs	Experimental evaluation of alternative business process designs in laboratory setting, process performance evaluation (data retrieval) based on the experimental economics methods	Controlled experiment and experimental economics for the evaluation of process alternatives	Improvement of the process as a tool intended to generate performance
Yen, 2009	Integrated model for business process measurement	Developed cumulative measure for business process evaluation	Analytic hierarchy process methodology	Business process performance measurement
Zhu et al., 2014	Location-awareness approach to the context-aware business process modeling	Design specifications for location-aware process pattern	Business process modeling, literature analysis	Improvement of the process as a tool intended to generate performance

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(15)

Jolanta ZEMGULIENE, PhD is the Associate Professor at Business Department, Faculty of Economics and Business Administration, Vilnius University, Lithuania. Research interests: business process management, sustainability of service business.
ORCID ID: orcid.org/0000-0002-6085-4046

Mantas VALUKONIS, PhD is the Assistant Professor at Institute of Economics, Finance and Management, Kaunas Faculty, Vilnius University, Lithuania. Research interests: business sustainability and risk management, financial markets.
ORCID ID: orcid.org/0000-0002-0076-8891

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (Septeber)
http://doi.org/10.9770/jesi.2018.6.1(16)

Publisher
http://jssidoi.org/esc/home

DESTRUCTIVE MOTIVATION OF PERSONNEL: A CASE STUDY OF RUSSIAN COMMERCIAL COMPANIES

Alexander Borisov[1], Diana Narozhnaia[2], Elena Tarando[3], Alexey Vorontsov[4], Nikolay Pruel[5], Olga Nikiforova[6]

[1, 3, 5, 6] Saint-Petersburg State University, [2] Moscow State University by the name of M.V. Lomonosov, [4] Herzen State Pedagogical University of Russia

E-mails:[3] elena.tarando@yandex.ru

Received 10 March 2018; accepted 20 August 2018; published 30 September 2018

Abstract. The article analyzes the results of an empirical study of the causes of destructive motivation of personnel in Russian commercial organizations. The study was conducted by questioning two hundred employees of commercial organizations in Moscow. The purpose of the research is to reveal the opinion of employees on the causes of destructive motivation of personnel and measures for their elimination. The empirical study revealed the influence of organizational factors on the existence of destructive personnel motivation in organizations, such as: labor organization; remuneration system, benefits and career management; control over the activities of employees; group communications and organizational culture. The study revealed the impact of personal characteristics of employees on destructive motivation. In the course of the survey, the degree of influence of various groups of reasons on the demotivation of employees in the studied commercial organizations was revealed, as well as on the micro-political motivation of employees. In the course of the questionnaire, assessments of the main forms of destructive behavior were obtained, which allowed for developing more detailed recommendations for limiting this negative phenomenon. The practical significance of the research is the results of an analysis of various factors of the internal environment of the organization and the personal characteristics of employees that are significant for the formation of destructive motivation of employees of Russian companies in a transitional economy.

Keywords: motivation; demotivation; destructive motivation; deviation; anomie; micro-political motivation; motivational policy; destructive motivation model

Reference Borisov, A.; Narozhnaia, D.; Tarando, E.; Vorontsov, A.; Pruel, N.; Nikiforova, O. 2018. Destructive motivation of personnel: a case study of Russian commercial companies, *Entrepreneurship and Sustainability Issues* 6(1): 253-267. http://doi.org/10.9770/jesi.2018.6.1(16)

JEL Classifications: M12, M54, M59

Additional disciplines: sociology; psychology

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

1. Introduction

Historical experience convincingly demonstrates that the motivation of employees, including managers, their desire for conscientious and initiative work is one of the key factors for the success and failure of any business organization. Until recently, the main attention of scientists and practitioners-leaders was paid to constructive motivation, searching for ways to increase it, with no proper attention to motivating the destructive, hindering the achievement of the organization's goals. And, meanwhile, this type of motivation causes immense harm to the organization generates a number of negative phenomena, such as protectionism, nepotism, internal dismissal of an employee, sabotage and even economic crimes: corruption, theft, abuse of power, etc. The destructive motivation of personnel leads to a decrease in the rate of production, profit, quality of products or services, conflicts in the team, strained relations between employees and employers, and other negative consequences. All these threaten the stability of the organization, and often its very existence. Managers of organizations are aware of the danger of this negative phenomenon, but they note that the management of the destructive motivation of the personnel is one of the most important and difficult tasks for them.

Indeed, the enormous negative impact of destructive motivation on the activities of organizations, the weak scientific and theoretical elaboration of questions about the causes and consequences of the reproduction of this socio-managerial phenomenon, and the lack of systematic recommendations in the scientific literature to limit destructive motivation determine the relevance of the topic of this study.

The purpose of this article is to identify and systematize the main causes of destructive motivation of personnel in commercial organizations, as well as the development of a set of recommendations for limiting this negative phenomenon. This goal can be achieved by solving the following tasks: identifying key causes of destructive behavior of personnel; investigating the degree of influence of the characteristics of the internal environment of the organization on the existence of destructive organization of personnel; identifying the main forms of destructive behavior of personnel in commercial organizations; developing a set of recommendations on eliminating or limiting the causes of destructive motivation of personnel in commercial organizations of modern Russia.

The study contained the following hypothesis: the main reasons for the destructive motivation of the personnel are such characteristics of the internal environment of the organization as unfair and too low remuneration, as well as imperfection of the system of control over the activities of employees.

2. Literature review

In the scientific literature, the destructive motivation of employees is investigated as a type of labor motivation and contrasted with constructive motivation, the realization of which allows the organization to achieve its goals.
In the world scientific literature, the study of destructive motivation and destructive organizational behavior as its manifestation was made primarily with respect to the identification of its various species and the construction based on this classification. Thus, such types of destructive organizational behavior as aggressive behavior towards colleagues in the work, poor performance of their duties, sabotage, including deterioration of the property of the organization, theft, absenteeism, expressed in delays, deliberate increase in breaks, etc., were singled out (Spector et al., 2006). In addition, there are developments in which destructive behavior is classified according to the level at which its consequences are felt. Thereby two main such levels are distinguished: interpersonal, when destructive behavior harms concrete employees working in the organization (aggression, insults, rumors, etc.), and organizational, when the damage is done to the organization (absenteeism, sabotage, theft, etc.) (Bashir et al., 2012).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

Currently, researchers of destructive motivation came to the conclusion that this phenomenon can be generated by measures for the formation of constructive motivation. If earlier it was believed that such measures either bring the intended result, or have no effect, now scientists have come to the conclusion that the result of such measures can be negative, forming a destructive motivation. Thus, R. Faullant and G. Dolfus (2017) write that managers "have to be aware that "Top Innovators" lists are a double-edged sword. On the one hand, they are a perfect motivator for members to be constantly active; on the other hand, these lists create fierce competition among contestants, inducing some of them to misuse interaction channels or even to sabotage other members" (Faullant, Dolfus, 2017).

In studies of destructive motivation, the internal environment of the organization is indicated as its main source at the present time. Therefore, the study of this phenomenon is conducted in the direction of identifying elements of this environment and their influence on the formation of destructive motivation and destructive behavior. "Toxic" management practices are seen as one of such key elements. Authors investigating this factor, suggest building strong ties between employees as an antidote: "By creating an environment that enhances and maintains adaptive and safe interactions among employees, organizations can reduce employees' overdependence on their supervisor for the need to feel valued and help buffer the negative consequences associated with abusive supervision" (Vogel, Mitchell, 2017: 2246). Similar recommendations are given by other authors investigating this phenomenon (Indradevi, 2016; Vogel et al., 2016; Hommelhaft, 2017; Pink, 2013). The opportunistic behavior of employees is studied both consequentially and in line with the determining influence of the internal environment of the organization on the formation of destructive motivation (Auriol, Brilon, 2018; Ma, 2016; Neuberger, 2015; Dhar, 2012; Brown et al., 2009; Blickle et al., 2006).

The Russian scientific literature sees the problematic of destructive motivation as relatively new. Its analysis can be seen in several planes. First of all, the factors that form this kind of labor motivation among employees are revealed. In particular, such factors as excessive regulation of labor and organizational behavior, personal problems (family relationships, domestic difficulties, etc.), personal qualities negative for the labor process (laziness, lack of internal discipline, irresponsibility, conflictness), etc. (Snisarenko, 2017). It is noted that the destructive motivation is investigated from the point of view of the effectiveness of the organization's objectives as damaging this effectiveness (Duduyeva et al., 2016; Dudina, 2017; Rubtcova, Mart'yanova, 2016; Kharitonova, 2013). Simultaneously, a number of researchers analyze the influence of individual factors of destructive motivation on the effectiveness of work collectives (Brazevich, Misyukevich, 2016, Pugachev, 2014, Khaliullina, 2010).

There is a layer of scientific literature in which studies of destructive motivation are carried out in various professional groups, such as school teachers (Fedosova, 2016, Rakitskaya, 2015, Popova, 2014), civil servants (Dan'kova, 2017; Vasilieva, Rubtcova, 2017; Rubtcova, Vasilieva, 2015), employees of the Ministry of Internal Affairs (Zlokazov, 2014; Osintseva, 2013). This attention to these professional groups responds to the social importance of their professional functions.

In addition, it is noted that in connection with the transition of Russia in the 1990s to a market economy, there is an intergenerational difference in value systems, when the value system of the older generation, brought up under the dominance of Soviet values, differs significantly from the value system of the younger generation. Moreover, the younger generation is also not a homogeneous social group: the introduction of digital technologies into the social life forms a system of values corresponding to the digital society in the generation that grew up in these conditions (Ivanov, 2016). Differences in value systems determine differences in motivation of work among different generations of employees and, as a result, differences in conditions, causes and structure of destructive motivation of labor activity (Rybianets, 2016; Skvortsov, 1999).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

As a result of the analysis of destructive motivation, a number of authors suggest models of such motivation associated with models of self-development of an employee (Snisarenko, 2017) and models of labor potential of an employee and organization (Simonenko, 2011; Mikheeva, 2005). It is noted that destructive motivation is a phenomenon embedded in these models, which can accompany the labor process in any category of employees.
There is another aspect of the study of destructive motivation in Russian literature: an analysis of its forms (Zmanovskaya, 2004; Spivak, 2006; Donskikh, Korolenko, 1990; Sackett et al., 2006; Boykov, 2004; Kudryavtsev, 2007; Luneev, 2005; Bogdanova , 2010) and types such as demotivation and micro-political demotivation (Belkin, 2009; Andreeva, Yurtaikin, 2002; Ivanova, 2013; Kuznetsova, 2012; Tkachenko, 2011; Florovsky, 2011; Sprenger, 2007).

An important component of studies of destructive motivation is the search for restrictors of this phenomenon of working life (Veselov, 2000). At the same time, focusing on the analysis of conditions, causes, social nature, the structure of this phenomenon, the authors, as a rule, only state the existence of destructive motivation and the necessity of its restriction. Some manuscripts give recommendations on overcoming a number of its negative consequences. At the same time, social technologies for limiting destructive motivation are not sufficiently analyzed in the scientific literature, which makes it urgent to study social practices of limiting destructive motivation in Russian organizations and analyzing relevant technologies.

3. The method for studying the destructive motivation of the personnel

The purpose was to find out the causes of the destructive motivation of staff at the level of the internal environment of the organization and at the level of the employee's personality. To reach this purpose, a sociological survey was conducted in the form of a questionnaire survey of employees of such commercial companies as “Novard”, “Bovstr”, and “Protection” in Moscow. These companies represent different levels of business: small (22%); medium (50%), and large (28%). They specialize in software development, educational services, consulting, construction, and repair of banks and offices, as well as real estate sales. The total sample size was N = 200 respondents. The sampling type is a non-random sample using the snowball sampling method, which assumed that subsequent respondents were selected after reference to the initially selected respondents. The study was conducted on a structured questionnaire, which was sent to respondents by e-mail for completion. The method of questioning, developed by the authors, was used to make up the theoretical model of destructive motivation of personnel. Accordingly, the questions of the questionnaire were put to respondents for each block of identified factors (subsystems) that determine the destructive motivation: the organization of labor; rewards and benefits; control over the activities of employees; group communications and organizational culture; personal characteristics of the employee. The respondents were to assess the extent to which they affect the existence of destructive motivation in the organization. The questionnaire included 11 questions concerning the essence of the phenomenon under study, as well as 4 questions of the passport. The total number of questions was 22.

The formulation of the questions was simplified as much as possible in order to ensure their adequate understanding by respondents who are not familiar with the main categories of the concept of destructive motivation, although they regularly encounter such motivation in their practical activities. The obtained data allowed for analyzing the most complex aspects of the problem, to justify the conclusions and make practical recommendations. The object of the study is the destructive motivation of the personnel of commercial organizations in Moscow. The subject of the research – is the interaction between the characteristics of the internal environment of the organization and the personal characteristics of employees when determining the destructive motivation of personnel. The main goal of the research is to reveal the opinion of employees on the degree of influence of the theoretically determined groups of causes on the existence of destructive motivation of personnel. The following tasks were set for this goal as defining:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

- Attitude of respondents to destructive organizational behavior in general, and to its various types (theft, fraud, absenteeism, etc.), in particular;
- The most dangerous for the organization from the point of view of the respondents are the types of destructive organizational behavior;
- The determinism degree of destructive motivation by the characteristics of the internal environment of the organization, contained in the subsystems of the organization of labor; remuneration, benefits and career management; control over the activities of employees, personnel assessment and punishment of violators of organizational order; organizational culture; group communications;
- Degree of determinism of destructive motivation by personal characteristics of employees;
- Degree of influence of the causes of the destructive motivation of the internal environment of the organization and the personal causes of destructive motivation for the implementation of various forms of destructive organizational behavior. The study contained the following hypothesis: The main reasons for the destructive motivation of the personnel are the following characteristics of the internal environment of the organization: unjust remuneration in the opinion of employees, too low remuneration; imperfection of the control system over the activity of employees.

The total sample size was 200 respondents. The sample is random. An empirical study of the problem of destructive motivation of personnel in commercial organizations is associated with a number of difficulties that significantly complicated its implementation. Certain restrictions on the conduct of the study imposed a sensitivity of the topic; the respondents answered questions with caution, because they were afraid to appear in an unfavorable light. Also, in spite of the fact that some aspects of destructive motivation are rather widely discussed within the framework of management theory, on the whole, the very notion itself does not have a wide distribution in the mass consciousness, and the respondents understood it with a significant degree of subjectivity. In addition, until now there is no well-developed sociological toolkit necessary for data collection and subsequent analysis of the destructive motivation of personnel. Despite the difficulties associated with the study of destructiveness in specific organizations, the results obtained are of some interest for identifying the reasons for the reproduction of destructive motivation, their configuration, and the degree of expression in modern Russian companies. They also provide an opportunity to consider the problem of destructive motivation of personnel from the organizational and managerial point of view, which makes it possible to develop comprehensive recommendations to limit this negative phenomenon.

4. Results

When carrying out the questionnaire, respondents were asked to assess the degree of influence of the grouped characteristics of the internal environment of the organization and the personal qualities of the employee on the existence in the organization of destructive motivation of the personnel. The study was also focused at analyzing the subordination of the causes of the destructive motivation of meso- and micro-level personnel.

At the first stage, the respondents were consistently asked questions about the significance of all the models, modeled theoretically and reflected in the models developed by the author, the causes of destructive motivation, which are characteristics of the internal environment of the organization.

Table 1 shows the results of determining the degree of influence of the characteristics of the labor organization subsystem on the existence of destructive motivation in the organization (Table 1).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

Table 1. Influence of the characteristics of the subsystem of labor organization on the destructive motivation of personnel

Destructive motivation factors	Answers (%)		
	Affects a lot	Affects partially	Does not affect
Unclearly formulated and (or) unknown to employees goals, tasks and requirements of the organization (employees do not exactly know what results they need to achieve, therefore they act at own discretion)	52.5	37.5	10.0
Lack of feedback when performing tasks (the supervisor does not give comments, assessments, advice when doing the work)	37.5	52.5	10.0
Unattractive working conditions (noise, insufficient illumination, lack of air conditioning, etc.)	37.5	57.5	5.0
The content and characteristics of labor do not correspond to the employee's expectations (work is too monotonous, tedious, uninteresting, tasks do not have significance, or, on the contrary, work requires excessive responsibility, etc.)	42.5	27.5	30.0
Fuzzy division of functions, responsibilities and powers between employees, allowing to act at own discretion	40.0	52.5	7.5

52.5% of respondents think that the goals, tasks and requirements of the organization are vaguely formulated and (or) unknown to employees, that is, the situation when employees do not exactly know what results they need to achieve, which most strongly affects the existence of destructive motivation.

The result is explained by the presence of “gray zones” in a situation when the goals, tasks and requirements of the organization do not fulfill their normative function, which provokes the spread of micro-policy. Also, this situation can turn into a state of frustration for employees, which grows into demotivation, resulting in absenteeism.

In addition to assessing the significance of the causes of the destructive motivation of the personnel, the respondents had the opportunity to complete the characteristics that they believe also affect the existence of destructive motivation of the personnel within each of the allocated subsystems. The availability of such independent answers as “the absence of a sense of belonging to something important, significant, creative component” became indicative; “lack of verification of psychological compliance with the workplace when hiring”. These answers show a high level of consciousness of the interviewed employees who perceive work activity as a need of the individual, as well as an interest in providing objective data for the ongoing research.

In the subsystem of remuneration, benefits and career management, the greatest impact on the existence of destructive personnel motivation, according to respondents, is the injustice of remuneration - 87.5. In the second place was too low remuneration of labor, its influence was noted by 77.5% of respondents (Table 2).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

Table 2. Influence of characteristics of a subsystem of compensations, privileges and management of career on destructive motivation of the personnel

Destructive motivation factors	Answers (%)			
	Affects a lot	Affects partially	Does not affect	Difficult to answer
Lack of career perspectives	35.0	42.5	20.0	2.5
Lack of possibilities for training and advanced training	20.0	45.0	32.5	2.5
Lack of social package or its mismatch with the expectations of an employee	10.0	65.0	22.5	2.5
Injustice of remuneration for the labor	87.5	12.5	0	0
Too low remuneration	77.5	22.5	0	0

As a result of the survey, a correlation was found between the age of respondents and the degree of their influence that lack of career prospects on organizational behavior. A younger group of respondents identified this characteristic as the cause of destructive motivation more often than a group of more mature respondents.
Among the characteristics of the subsystem for monitoring the activities of employees, assessing personnel and punishing violators of the organizational order, the most significant, in the opinion of the respondents, is the situation in which control over the activities of employees is weak or absent. 64.1% of respondents noted the influence of this reason on destructive motivation of personnel.

The second place in importance among the characteristics of this subsystem went to the situation in which the facts of destructive organizational behavior remain unpunished, or the punishment turns out to be excessively mild. Its impact was noted by 51.3% of respondents (Table 3).

Table 3. Influence of the characteristics of the subsystem of control over the activities of employees in assessing personnel and punishing violators of organizational order for the destructive motivation of personnel

Destructive motivation factors	Answers (%)			
	Affects a lot	Affects partially	Does not affect	Difficult to answer
Absence or excessive softness of punishment for destructive behavior	51.3	43.6	2.6	2.6
Control by fellow employees is absent or extremely weak	10.3	30.8	51.3	7.7
The evaluation of employees, their work, competencies and organizational behavior is inadequate and is perceived as unfair	25.6	46.2	10.3	17.9
Control by management for the activity of the employees is weak or absent	64.1	30.8	5.1	0

Thus, when developing recommendations for limiting destructive motivation, it is also necessary to give special attention to building an optimal system for controlling the activities of employees.

The need to develop an effective monitoring system is also confirmed by the results obtained when answering the question of how the situation in which employees are given ample opportunities to act at their discretion is affected by the destructive motivation, their duties are not clearly regulated by rules and regulations, and their control is weakened or absent. 68% of respondents believe that with insufficient level of external control and regulation of the organizational process, destructive motivation will be widespread. Employees will work worse and more often pursue only their personal interests to the detriment of the interests of the company. At the same time, only 32% of respondents noted that a decrease in the degree of external control will allow employees to

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

more effectively open their potential. The authors believe that the data obtained indicate a low level of internal motivation of this part of the respondents, as well as an insufficient degree of their identification with the organization and involvement in the work process. Theoretical analysis of the problem of destructive motivation has shown that the characteristics of subsystems of group communications and organizational culture exert a significant influence on the existence of destructive motivation. The respondents' opinion on the degree of influence of the characteristics of these subsystems on the existence of destructive motivation of personnel in the organization is reflected in Table 4.

Table 4. Influence of characteristics of subsystems of group communications and organizational culture on destructive motivation of the personnel

Destructive motivation factors	Answers (%)			
	Affects a lot	Affects partially	Does not affect	Difficult to answer
Organizational culture in which destructive organizational behavior is acceptable is not condemned	33.3	25.6	17.9	5.1
Unhealthy psychological climate in the team (regular conflicts, acute competition, lack of mutual assistance and support among employees)	53.8	35.9	10.3	0
Official (professional and managerial) incompetence of the manager	35.9	38.5	15.4	10.3
Immoral, unjust behavior of the manager towards subordinates	51.3	33.3	15.4	0
The role of an employee in an informal group (leader, performer, adviser, expert, etc.) and the functions corresponding to it do not meet his inclinations and expectations	17.9	41.0	20.5	20.5

Among the causes of destructive motivation contained in these subsystems, the most significant, in the opinion of respondents, has such characteristics as unhealthy psychological climate in the team (53.8%). It is significant that the second most popular among the reasons for this subgroup was the factor of immoral, unjust behavior of the manager towards subordinates (51.3%). The authors believe that the high degree of significance of this cause of destructive motivation is associated with long traditions of authoritarian governance in the country, low moral qualities of managers, and lack of managerial knowledge and competencies.

There are many people among the managers of Russian companies, who do not have professional knowledge of how to manage subordinates and are not accustomed to reckon with them, respect their rights. This situation, in turn, becomes a significant reason for the development of destructive motivation of personnel in organizations.
Noteworthy was one of the independent answers about the causes of the destructive motivation of this subsystem of the organization, which was formulated as “non-observance of gender balance in the team”. Undoubtedly, the specific nature of the sphere of activity of the organization, as well as the specific division, determines the gender composition existing in them. Thus, if the organization is engaged in IT, then it is mostly men, who work there, but, for example, women are mainly employed in the HR department. However, as shown by psychological research, for the most productive activities, it is necessary to maintain a gender balance, since its impact on the consciousness and behavior of employees is sufficiently significant.

A comprehensive analysis of destructive motivation and development of practical recommendations for limiting it, in addition to investigating the causes of destructive motivation, which are characteristics of various subsystems of the internal environment of the organization, also requires considering the causes of destructive motivation associated with the personal characteristics of employees. In accordance with this, respondents were

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

asked about the degree of influence of various personal characteristics of employees on the destructive motivation of the personnel. Table 5 shows how the answers to this question were distributed.

Table 5. Influence of personal characteristics of employees on destructive motivation

Destructive motivation factors	Answers (%)			
	Affects a lot	Affects partially	Does not affect	Difficult to answer
Properties that are a manifestation of certain deviations in personal development, psychological complexes, “strangenesses”, etc.	28.2	30.8	17.9	23.1
Insubstantiality, manifested in a tendency to cause disposition and self-confidence in flattery, feigned courtesy	10.3	51.3	25.6	12.8
Sufficiently developed intellect and self-awareness, personal autonomy, independent judgments, critical thinking	15.4	20.5	51.3	12.8
Increased predisposition to risk and adventurism	12.8	59.0	17.9	10.3
Low moral standards, lack of sustainable ethical values, moral insensitivity	38.5	33.3	7.7	20.5
Predisposition to destructive behavior based on a successful past experience	43.6	35.9	7.7	12.8
Individualism and selfishness	20.5	53.8	20.5	5.1
Lack of spirituality, orientation only on material prosperity	12.8	53.8	28.2	5.1

According to respondents, such personal qualities of the employee as predisposition to destructive behavior on the basis of successful past experience and low moral standards, the lack of sustainable ethical values, and lack of principle have the greatest influence on the existence of destructive motivation. These responses got 43.6% and 38.5% respectively.

Independent answers of the respondents as per this group of factors are also interesting. Thus, they called “laziness and unwillingness to work”, “active destructive inner beginning” - inducing their colleagues to destructive behavior such as “let's skip a class altogether” - as the personal qualities of employees who determine destructive organizational behavior.

An important, in our opinion, addition to the highlighted theoretically personal characteristics is the initiative response of one of the respondents, according to whom the cause of destructive motivation can be the situation of “the employee's capacity limit (inability of an employee to do work above a certain level)”. The following characteristics correlates with the previous one: “the employee is employed not in accordance with the diploma and received specialty”. That is, the shortage of the employee's abilities is aggravated by managerial mistakes, for example, by assigning tasks that require the employee to have the competence they do not have, or the super-power for which they are not capable. In the end, this leads to destructive motivation.

5. Discussion

The study by E.N. Mikheeva (2005) is the one that mostly correlates with the tasks of this manuscript among the empirical studies devoted to destructiveness in organizational behavior published in the recent years. She conducted an analysis of the labor behavior of the employees of Lukoil-Volgogradneftepererabotka and Sibur-Volzhsky in Volgograd, and one of the areas of analysis was the identification of factors that determine destructive behavior at enterprises.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

According to the results of E.N. Mikheeva (2005), the key reasons for the implementation of destructive behavior are the following: insufficient accounting of labor results (26.1% and 39.6%) - as of now and further brackets contain the percentages of employees of enterprise-1 and enterprise-2, who noted this factor as determinative destructive behavior; poor condition of the equipment (37.2% and 78.0%), unsatisfactory sanitary conditions of work (22.9% and 47.4%), a system of moral and material incentives that does not meet the needs of employees (42.7% and 73.4%), lack of opportunities for professional growth (17.5% and 47.1%); unsatisfactory relations with the head (44.0% and 43.0%), and low remuneration (45.6% and 88.5%).

As a result of her research, E.N. Mikheeva (2005) concludes that the factor of low remuneration is the most strongly influencing the spread of destructive behavior of employees. However, this study shows that many other factors of the organizational environment are approximately equally important determinants of destructive labor behavior. This means that only a complex impact on the organizational system will minimize the destructive motivation of personnel and reduce its manifestations in the form of specific forms of destructive organizational behavior.

The study by E.N. Mikheeva (2005) considers a significant set of various characteristics of the organizational environment that determine the destructive behavior of employees. However, its significant drawback is that when identifying the causes of destructive behavior, various specific forms of this phenomenon are not distinguished. The current study managed to overcome this drawback. The questionnaire identified forms of destructive organizational behavior, which are the most dangerous for the organization, namely: absenteeism (absence of an employee at the workplace without good reason, dawdle, deliberate increase in lunch and other breaks in work, etc.); spreading rumors and deliberate slander; abuse of official authority; violation of organizational regulations; protectionism, patronage by the leader only to “own people”: personally loyal subordinates, relatives, friends, acquaintances, etc., in return for their unquestioning support in violation of the norms of the organization and the rights of other employees; fraud; theft; sabotage; malicious destruction of equipment, wasteful use of funds, raw materials, etc.

In the author's opinion, it is necessary to distinguish not only the essential determinants of the destructive behavior of employees, but also to separate them depending on the type of behavior that they determine, considering their danger to the organization. This idea is implemented in the author's empirical study. The empirical study by V.N. Kharitonova (2013) researches one of the forms of manifestation of destructive motivation - clientelism in state institutions. In accordance with the specifics of its goals, it identifies somewhat different factors that determine the spread of clientelism than in the study by E.N. Mikheeva (2005).
The study of the determinants of the spread of clientelism by V.N. Kharitonova (2013) shows that the main ones are the conflict of interests, as well as the personal qualities of the manager.

According to the results of the author's research, the most significant factors determining the destructive behavior of personnel at the organization level are: injustice of remuneration (i.e., the absence of direct correlation between the contribution of the employee to the company's results and the remuneration received) - 87.5%; the second place goes to too low remuneration - 77.5% of respondents: the third reason for the destructive motivation is the weakness or lack of control of the employees by the management - 64.1%.

As part of the discussion, the authors presented practical recommendations on limiting the destructive motivation of personnel at the level of the internal environment of the organization: improvement of labor organization; control over the activities of employees; remuneration, benefits and career management; group communications and organizational culture; personal qualities of employees.

Conclusion

Summarizing the results of an empirical study of the causes of destructive motivation of personnel in Russian commercial organizations, we came to the following conclusions.

First, the study on the main causes of destructive personnel motivation is based on the results of research on this problem by Russian and foreign scientists, as well as an empirical study conducted by the authors in 2017 in Moscow. Based on the results of these studies, the causes of the destructive behavior of personnel in a number of commercial organizations were established.

Second, the influence of intra-organizational factors on the destructive motivation of personnel was found out in the course of the conducted research.

Third, an essential novelty of this work is to investigate the degree of influence of the characteristics of the internal environment of the organization on the existence of destructive motivation of personnel. The study showed that injustice of remuneration, too low remuneration of labor, weakness or lack of control by management of employees is the main reasons for destructive personnel motivation.

Fourth, the main forms of destructive behavior of personnel were identified in the course of the research and the degree of their danger for commercial organizations was determined as well.

Fifth, the research resulted in confirmation of the hypothesis that the formation of destructive motivation of personnel in commercial organizations is a consequence of interaction of external, intra-organizational and personal factors, the leading role among which is played by organizational reasons. In modern Russian companies, the most important among them are the system of labor remuneration that is unfair from the point of view of employees and an inefficient control system.

Further study of the destructive motivation of personnel, the development of appropriate measures to limit it and their implementation would greatly enhance the efficiency of commercial organizations and would have a significant impact on the positive development of our country as a whole.

References

Andreeva, T., Yurtaikin, E. 2002. Why do apple fall or internal demotivation of personnel. *Top Manager*, 22: 46-52. URL: https://www.cfin.ru/management/people/demotivation.shtml [in Russian].

Belkin, V.N., Belkina, N.A. 2009. Demotivation of labor and opportunism of the employees of the organization. *Chelyabinsk Humanitarian Scientific Journal*, 1(7): 37-46. In print.

Bogdanova, N.Yu. 2010. Opportunistic behavior in commercial companies of Ukraine and Russia: the experience of sociological research. *Dissertation of the Candidate of Sciences (Sociology)*. URL: https://cyberleninka.ru/article/n/opportunisticheskoe-povedenie-k-formulirovke-ponyatiya [in Russian].

Boykov, V.E. 2004. Values and goals of social consciousness of Russians. *Sociological research*, 7: 46-52. URL: http://ecsocman.hse.ru/data/852/838/1219/006.BOIKOV.pdf [in Russian].

Brazevich, D.S., Misyukevich, A.N. 2016. Social conflicts in modern organization and psychological models of their solution. *Conflictology*, 3: 131-139. URL: https://elibrary.ru/item.asp?id=27327795 [in Russian].

Dankova, E.V. 2017. Professional motivation in the context of deformation of social values. *State Service*, 3(107): 12-16. URL: https://elibrary.ru/item.asp?id=29869400 [in Russian].

Donskikh, T.A. 1990. *Seven ways to a disaster. Destructive behavior in the modern world*. Novosibirsk: Nauka. URL: https://books.google.com.ua/books/about/%D0%A1%D0%B5%D0%BC%D1%8C_%D0%BF%D1%83%D1%82%D0%B5%D0%B9_%D0%BA_%D0%BA%D0%B0%D1%82%D0%B0%D1%81%D1%82%D1%80%D0%BE.html?id=m24vAAAAIAAJ&redir_esc=y [in Russian].

Dudueva, F.A., Lipatova, A.E., Pashko, A.I., Semikhova, M.A., Tretiakov, Ya.A. 2016. Modern researches of personnel. Sociological analysis of managing personnel and employment in dissertational researches. *Bulletin of the Moscow University. Series 18. Sociology and politology*, 4: 194-216. DOI: https://doi.org/10.24290/1029-3736-2016-22-4-194-216.

Zlokazov, K.V. 2014. Peculiarities of legal regulations of police officers in connection with the destructiveness of personality. *Scientific portal of the Ministry of Internal Affairs of the Russian Federation*, 3(27): 118-124. URL: https://cyberleninka.ru/article/n/osobennosti-formirovaniya-obraza-sotrudnika-politsii-sotsialno-psihologicheskaya-model-i-indikatory-otsenki [in Russian].

Zmanovskaya, E.V. 2004. *Deviantology. Psychology of deviant behavior*. Moscow: Akademiya. URL: https://www.e-reading.club/book.php?book=107411 [in Russian].

Ivanova, S.V. 2013. *Motivation for 100%: Where is its button?* Moscow: Alpina Publisher. URL: https://mybook.ru/author/s-v-ivanova/motivaciya-na-100-a-gde-zhe-u-nego-knopka/read/ [in Russian].

Kudryavtsev, V.N. 2007. *Motives struggle in criminal behavior: scientific publication*. Moscow: NORMA. URL: https://www.twirpx.com/file/587612/ [in Russian].

Kuznetsova, E.A. 2012. Demotivation of personnel: causes, factors, methods of elimination. *Modern research of social problems*, 11(19). URL: https://cyberleninka.ru/article/n/demotivatsiya-personala-prichiny-faktory-metody-ustraneniya [in Russian].

Levada-Tsentr. 2013. A quarter of Russians consider it normal to steal at the workplace. Retrieved from: http://rusplt.ru/news/levadatsentr-chetvert-rossiyan-schitayut-normalnyimvorovat-na-rabochem-meste.html

Luneev, V.V. 2005. *Crime of the XX century: world, regional and Russian trends*. Moscow: Walter Kluwer. URL: https://www.twirpx.com/file/950764/ [in Russian].

Mikheeva, E.N. 2005. Destructive labor behavior at regional enterprises in new economic environment: on the example of Volgograd and Volgograd region. *Dissertation of the Candidate of Sciences (Sociology)*. URL: https://cyberleninka.ru/article/n/formy-destruktivnogo-trudovogo-povedeniya-rabotnikov [in Russian].

Osintseva, A.V. 2013. Subject-situational approach to the study of the destructive motivation of the officers of Department of Internal Affairs. *Scientific bases of professional development of employees of law enforcement bodies. Conference proceedings. Tyumen: Tyumen Institute for Continuing Education of the Officers of Russian Federation Ministry of the Interior*, 139-141. In print.

Pink, D. 2013. *Drive: What does really motivate us?* Moscow: Alpina Publisher. URL: http://moodle.usm.md/moodle/mod/resource/view.php?id=14636 [in Russian]

Popova, A.S. 2014. Research of the structure of professional motivation of teachers in school. *Bulletin of medical Internet conferences*, 4(11): 1154-1155.

Pugachev, V.P. 2014. Destructive motivation: micro-politics. *Deputy Chief Doctor*, 2(93): 88-96. URL: https://medconfer.com/node/4253 [in Russian].

Rakitskaya, A.V. 2015. Features of the emotional burnout syndrome in teachers with different levels of personal and situational aggression. *Psychology of learning*, 4: 78-90. URL: https://lib.vsu.by/xmlui/bitstream/handle/123456789/3837/%D0%A0%D0%B0%D0%BA%D0%B8%D1%86%D0%BA%D0%B0%D1%8F%20%D0%90.%D0%92..pdf?sequence=1&isAllowed=y [in Russian].

Rybyanets, O.V. 2016. The generation theory. Difference in values as determinants of destructive motivation. *Actual problems of sociology and management. Interuniversity collection of scientific manuscripts*, 19-26. In print.

Simonenko, N.N., Simonenko, V.N. 2011. Transformation of modern models of labor potential motivation. *Power and management in the East of Russia*, 4: 73-81. In print.

Snisarenko, I.M. 2017. Social determinants of the self-development of the company's personnel. *Theory and practice of social development*, 5: 60-65. URL: https://cyberleninka.ru/article/n/sotsialnye-determinanty-samorazvitiya-personala-organizatsii-1 [in Russian].

Spivak, V.A. 2006. The concept of developing personnel management. *Personnel development management*, 3: 52-61. URL: https://www.litres.ru/vladimir-spivak/upravlenie-personalom-uchebnoe-posobie/chitat-onlayn/page-3/ [in Russian].

Tkachenko, N.E. 2011. Risk of personnel demotivation: analysis of structural characteristics and possibilities of transformation. *Economics. Management. Entrepreneurship*, 23(II): 90-99. URL: http://www.vuzlib.com.ua/articles/book/35055-Risk_demotiva%D1%81ii_personala_an/1.html [in Russian].

Fedosova, I.V. 2016. Professional deformation of the personality of a teacher: diagnostics and prevention. *Azimuth of scientific researches: pedagogy and psychology*, 3(16): 191-195. URL: https://elibrary.ru/item.asp?id=27018703 [in Russian].

Florovskiy, S.Yu. 2011. Micro-political aspects of managerial interaction of the leaders of the organization. *Proceedings of the All-Russian Scientific and Practical Conference Actual problems of theoretical and applied psychology: traditions and perspectives. Yaroslavl, May 19-21, 2011*, 3. In print.

Khalliullina, R. 2010. Destructive criticism - the destroyer of employee's motivation. *Human resource management*, 19: 48-51. URL: http://www.top-personal.ru/issue.html?2567 [in Russian].

Kharitonova, V.N. 2013. Clientelism in the civil service: causes and ways for limitation. *Dissertation of the Candidate of Sciences (Sociology)*. URL: http://emsu.ru/face/dissert/avtoreferat_haritonovavn.pdf [in Russian].

Sprenger, R. 2007. *Rebellion of the individual. The reasons why we should completely rethink the essence of management?* Kaluga: Spiritual knowledge. URL: https://www.labirint.ru/books/158901/ [in Russian].

Auriol, E., Brilon, S. 2018. Nonprofits in the field: an economic analysis of peer monitoring and sabotage. *Annals of Public and Cooperative Economics*, 89(1): 157-174. https://doi.org/10.1111/apce.12197

Bashir, S., Nasir, M., Qayym, S., Bashir, A. 2012. Dimensionality of counterproductive work behaviors in public sector organizations of Pakistan. *Public Organization Review*, 12: 357–366. https://doi.org/10.1007/s11115-012-0177-8

Blickle, G., Solga, M: 2006. Einfluss. Konflikte, Mikropolitik. *Lehrbuch der Personalpsychologie*, 2: 611-650. URL: https://books.google.com.ua/books/about/Lehrbuch_der_Personalpsychologie.html?id=2cNIQJ3AV0wC&redir_esc=y

Brown, R.M., Brown, S.L., Johnson, A., Olsen, B., Melver, K., Sullivan, M. 2009. Empirical Support for an Evolutionary Model of Self-Destructive Motivation. *Suicide and Life-Threatening Behavior*, 39(1): 1-12. https://doi.org/10.1521/suli.2009.39.1.1

Dhar, R.L. 2012. Why do they bully? Bulling behavior and its implication on the bullied. *Journal of Workplace Behavioral Health*, 27(2): 79-99. https://doi.org/10.1080/15555240.2012.666463

Dudina, V.I. 2017. Strategies of metatheorizing in sociology. *Sotsiologicheskie Issledovaniya*, 12: 10-19. https://doi.org/10.7868/S0132162517120029

Faullant, R., Dolfus, G. 2017. Everything community? Destructive processes in communities of crowdsourcing competitions. *Business Process Management Journal*, 23(6): 1108-1128. https://doi.org/10.1108/BPMJ-10-2016-0206

Hommelhaft, S. 2017. Implicit managerial theories about followers and customers. *Journal of Service Theory and Practice*, 27(1): 47-68. https://doi.org/10.1108/JSTP-05-2015-0124

Indradevi, R. 2016. Toxic leadership over the years – A review. *Purushartha*, 9(1): 106-110. URL: https://www.researchgate.net/publication/317936124_Toxic_leadership_over_the_years_-_A_review

Ivanov, D.V. 2016. New configuration of inequality and flow structures of glam-capitalism. *Sotsiologicheskie Issledovaniya*, 6: 13-23. URL: http://socis.isras.ru/en/article/6220

Ma, C. 2016. The role of approach and avoidance motivation in employee voice: The moderating effect of ostracism and contingent self-esteem. *International Journal of Productivity and Performance Management*, 65(6): 744-759. https://doi.org/10.1108/IJPPM-01-2016-0002

Neuberger, 2015. O. *Mikropolitik und Moral in Organisationen. Herausforderung der Ordnung 2*. Stuttgart: Lucius & Lucius. URL: https://books.google.com/books/about/Mikropolitik_und_Moral_in_Organisationen.html?id=q4eyygAACAAJ

Schütz, M. 2015. *Die Macht der Mitarbeiter. Was Mikropolitik in Unternehmen bewirkt*. Frankfurter Rundschau. URL: http://www.fr.de/wirtschaft/gastwirtschaft/gastwirtschaft-die-macht-der-mitarbeiter-a-445739 [in German].

Rothlin, P., Werder, P.R. 2008. *Bore out!: overcoming workplace demotivation*. London: Kogan Page Limited. ISBN: 978-0749453398.
Rubtcova, M.V., Mart'yanova, M.V. 2015. *Professionalism*. Cambridge: Polity Press. In print.

Rubtcova, M., Vasilieva, E. 2015. Managing Human Capital: How Public Servants Support the Governance's Performance Conception in Russia. *Proceedings of 2015 International Conference on Public Administration (11th)*, 1: 237-247. URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2679549

Sackett, P.; Berry, C.; Wiemann, S.; Laczo, R. 2006. Citizenship and Counterproductive Behavior: Clarifying Relations Between the two Domains. *Human Performance*, 19(4): P. 441–464. https://doi.org/10.1207/s15327043hup1904_7

Skvortsov, N.G. 1999. Ethnicity: a sociological perspective. *Sotsiologicheskie Issledovaniya*, 1: 21-31. In print.

Spector, P.E., Fox, S., Domagalski, T. 2006. *Emotions, Violence and Counterproductive Work: Behavior*. Thousand Oaks, CA: Sage. URL: http://scholarcommons.usf.edu/psy_facpub/584/

Vasilieva, E., Rubtcova, M. 2017. Content analysis of representation of public administration in mass media: evidence from Russia? *Persrectivas de la communicacion*, 10(1): 109-118. URL: https://www.researchgate.net/publication/281481754_Representations_of_Trust_to_Public_Service_in_Russian_Newspapers_during_Election_Time_Corpus-based_Content_Analysis_in_Public_Administration_Sociology

Veselov, Y.V. 2000. Economic development of Russia. Reforms and the Russian national economy. *Sotsiologicheskie Issledovaniya*, 5: 146-149. In print.

Vogel, R., Homberg, F., Gericke, A. 2016. Abusive supervision public service motivation and employee deviance: The moderating role of employment sector. *Evidence-based HRM*, 4(3): 214-231. https://doi.org/10.1108/EBHRM-08-2015-0034

Vogel, R.M., Mitchell, M.S. 2017. The motivational Effects of Diminished Self-Esteem for Employees Who Experience Abusive Supervision. *Journal of Management*, 43(7): 2218-2251. URL: http://journals.sagepub.com/doi/abs/10.1177/0149206314566462

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.(16)

Alexandr BORISOV is the Doctor of Sciences (Sociology), the Professor of the Social Management and Planning Department at Saint-Petersburg State University.**ORCID ID**: 0000-0001-9533-5038

Diana NAROZHNAIA is the Candidate of Sciences (Sociology), the Assistant at the Personnel Management School of the State Management Department at the Moscow State University n.a. M.V. Lomonosov.**ORCID ID**: 0000-0001-7690-3546

Elena TARANDO is the Doctor of Sciences (Economics), the Professor of the Economic Sociology School at Saint-Petersburg State University. **ORCID ID**: 0000-0002-2474-2602
Alekcey VORONTSOV is the Doctor of Sciences (Philosophy), Professor at the Herzen State Pedagogical University of Russia. **ORCID ID**: 0000- 0002-0194-7293

Nikolay PRUEL is the Professor of the Social Management and Planning Department at Saint-Petersburg State University. **ORCID ID**: 0000-0002-9005-0102

Olga NIKIFOROVA is the Candidate of Sciences (Sociology), Associate Professor of the Economic Sociology School at Saint-Petersburg State University. **ORCID ID**: 0000-0002-5128-5195

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Publisher
http://jssidoi.org/esc/home

SCIENCE AND INNOVATION POLICIES IN NORTH AFRICAN COUNTRIES: EXPLORING CHALLENGES AND OPPORTUNITIES*

Amr Radwan

[1]*Academy of Scientific Research and Technology, 101 Kasr Al-Ainy str. 11516, Cairo, Egypt*

E-mail:amm@sti.sci.eg

Received 15 April 2018; accepted 10 July 2018; published 30 September 2018.

Abstract. Effective science, technology and innovation (STI) policies and strategies reflect a country's successful contribution to scientific advancement. While the economic and geopolitical framework of many North African Countries (NACs) transformed enormously during the past decades, their relevant policies and performance were not responsive enough in adapting to these dynamics. This review is meant to highlight the current development and evolution of NAC's STI policies as well as similarities and identified common societal challenges within NACs. It focusses on the nexus approach to water, energy and food. The findings of this review suggest that the existing reform and development of the STI system in NACs require reorientation towards higher socioeconomic relevance and innovation focus accompanied by legislative measures, effective monitoring and evaluation tools as well as engagement of relevant stakeholders and the adequate leverage of sufficient strategic investments.

Keywords: Science policy; innovation ecosystem; North Africa; North African Countries; technology development

Reference to this paper Radwan, A. 2018 Science and innovation policies in North African Countries: Exploring challenges and opportunities, *Enterpreneurship and Sustainability Issues* 6(1): 268-282. http://doi.org/10.9770/jesi.2018.6.1(17)

JEL Classifications: O1; 031; 032; 044; 055

* *This work received support from a project 5TOI_4EWAS (Energy, Water and Agriculture in the South Mediterranian Neigbourhood) co-funded by the Horizon 2020 Framework Programme of the European Union under Grant Agreement n° 692523*

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Additional disciplines: political sciences; sociology

1. Introduction

Science and technology (S&T) policies in North African Countries (NACs) were first developed in the 1990s. Egypt developed its S&T framework initiative in 1994 while Jordan adopted its national S&T policy a year later (Bizri, 2018e; Hanafi & Arvanitis, 2015). Currently, most North African Countries have national S&T policies and strategies. Some of these policies set very ambitious goals. For instance, Egypt aims to be among the top 40 countries worldwide in the fields of innovation, quality of scientific research institutions in addition to retention of innovative talents and capabilities by 2030 while being among the top 20 for the number of patents per year (Ayad, 2015; Bizri, 2018b).

Following 2011, several radical changes in science, technology and innovation policies have occurred in many NACs. After decades of stagnation, Egypt adopted in 2014 a new constitution which mandates the allocation of 1% Gross Domestic Product (GDP) to research and development, and stipulates in its article 23 that the state guarantees the freedom of scientific research while encouraging institutions as a means towards achieving national sovereignty and building a knowledge economy. Few weeks later, the Tunisian constitution was ratified giving similar importance to scientific research and innovation (article 41)[†]. For the first time in both countries, the constitution included explicit clauses that underscore the protection of intellectual property rights and the importance of building a knowledge economy. In this context, only Libya has similar explicit clauses in its constitutions among the other NACs. During the same period, neighboring Arab states reached several important milestones in scientific research (Bizri, 2018e; Malik & Awadallah, 2013). Both Qatar and Saudi Arabia have seen significant growth in the volume of scientific publications over the previous decade (Bizri, 2018c). The UNESCO Science Report: Towards 2030 (2015) indicated that Saudi Arabia counts two universities among the world's top 500. Some neighboring Arab countries now have several best practices and specific policies for supporting excellence in science and technology (Bizri, 2018c). Hence, there have been various considerable past accomplishments in the field of STI policy in different NAC countries, including measures for technology development and renewable energy incentives (Mansour & Kanso, 2017; Strielkowski et al., 2016; Melas et al., 2017; Tvaronavičienė et al., 2017; Tvaronavičienė et al., 2018; Tvaronavičienė, 2018; Schiffer, Swan, 2018). However, the evolution of public policies in these areas is limited in literature especially within the political transition period (Bizri, 2018e). Despite major differences in existing science and technology ecosystem settings, many NACs are currently engaged in reform plans that support public science engagement and the development of productive citizens who will advance the national economic interests of establishing knowledge economies. These reforms are driven by a recognition of the huge mismatch between the labor market needs and the outcomes of the education system (Malik & Awadallah, 2013). With the increasing number of postgraduate students in NACs like Egypt and Tunisia in the past decade (Figure 1), the employment rate remains a top economic challenge (Ayad, 2015; Malik & Awadallah, 2013). Some might argue that unemployment in NACs increases with higher levels of education, which many education practitioners and planners dispute (Mohamed Ali, 2014). In this respect, it is important to highlight that the root cause is related to the mismatch between the supply and demand for skills in the system, which in turns, reflects the inefficiency of existing measures and policies (Malik & Awadallah, 2013; Mansour & Kanso, 2017).

[†] Article 41 of Tunisia's Constitution of 2014. https://www.constituteproject.org/constitution/Tunisia_2014.pdf

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

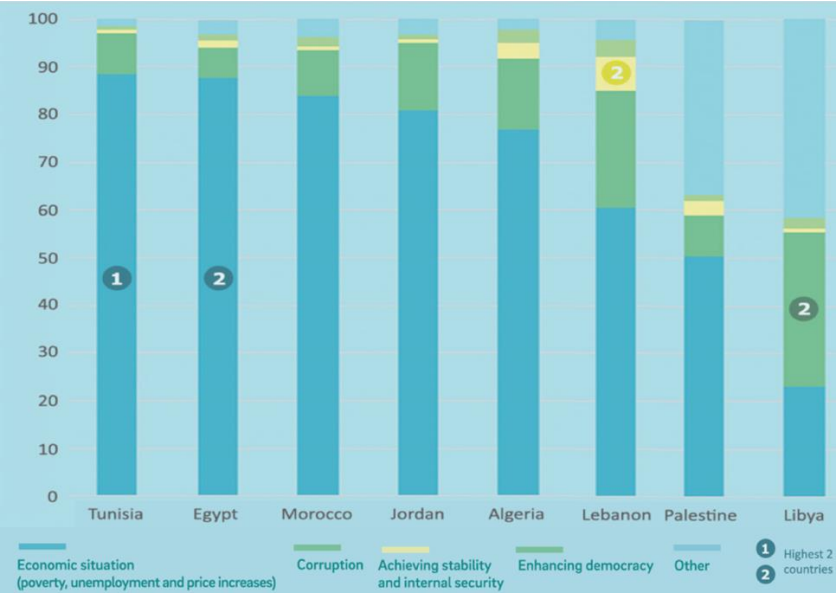


Figure 1. Most important challenges facing North African and South Mediterranean Countries. *Source*: Derived from Arab Barometer report 2014 and Arab Human Development Report 2016

2. Innovation ecosystems and governance of science and technology

The highly-centralized structure of the STI system in NACs might hinder long-term development plans. Despite the existence of overarching bodies, coordination among the main actors of the innovation ecosystem seems insufficient (Hamidi & Benabdeljalil, 2013; Khodr & Uherova Hasbani, 2013). In this context, there are striking similarities between NACs. The permanent inter-ministerial committee for scientific research, innovation and technological development in Morocco has a similar role to the Supreme Council of Scientific Research in Egypt where many relevant ministries are represented in one committee that aims to coordinate and align priorities. Both are presided over by the prime minister of each country and considered the principle policy-making body. In Morocco, the government authority for scientific research acts as the secretariat and main supporter for the above-mentioned committee. In Egypt, the Ministry of Higher Education and Scientific Research supports the operation of the supreme council, which organized only a few meetings and was disbanded following the Egyptian revolution in 2011 (Bizri, 2018d; Hamidi & Benabdeljalil, 2013; Radwan & Sakr, 2017). Like the Moroccan inter-ministerial committee and the Egyptian supreme council, the Jordanian Higher Council for Science and Technology (HCST) plays a significant role with the involvement of several ministers. The HCST has a clearer organizational structure and responsibilities, an independent budget, eight affiliated research centers and specific units dedicated to business incubator network and intellectual property rights (Elshuraydeh, 2007). Furthermore, the coordination of research and innovation activities in Algeria is centrally managed by the Directorate General for Scientific Research and Technology Development (DGSRTD) which was established in 2008. DGSRTD is supported by an inter-sectoral committee composed of representatives from several relevant ministries (Bizri, 2018d).

Although interactions between stakeholders are adequately tackled by several policies in NACs, it still represents a clear challenge with the obvious overlapping between several actors. Most NACs have a complex system of research and innovation that requires strong coordination measures and better allocation of resources(Bizri, 2018b). Fragmentation and lack of coordination are also persistent; for example, the Egyptian Ministry of Higher Education and Scientific Research supervises only 11 research centers while other research centers are supervised

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

by more than five different ministries. With the idle-status of the supreme council since 2010, this lack of coordination is expected to exacerbate (Radwan & Sakr, 2017). The case of Lebanon appears to be more decentralized and dynamic compared to the Egyptian governance structure, but several coordination challenges still exist with the involvement of many regulatory and organizational bodies (Khodr & Uherova Hasbani, 2013). Despite differences in research governance, it remains important for NACs to share best practices and lessons learnt.

Some authors have indicated the ineffectiveness or complete missing of an overarching research strategy in NACs, which widens the gap between policy and implementation (Bizri, 2018e; The UNESCO Science Report: Towards 2030, 2015). A recent study on Egypt's research and innovation ecosystem indicated that strategies and roadmaps developed by relevant national councils are usually not binding to research performing organizations (A. Radwan & M. Sakr, 2017). Although some coordinating actors are involved in the national system of research and innovation like the Egyptian Academy of Scientific Research, coordination among several actors is not sufficient. Similarly, in Lebanon and Algeria some authors have indicated the importance of having specific coordination measures, supported by policies, that shape and stimulate coordination among several actors at the national level, especially with respect to the role of CNRS in the five-year Science, Technology and Innovation Policy (STIP) in Lebanon (Khodr & Uherova Hasbani, 2013).

A series of interviews that have been conducted with policy makers in Lebanon in a previous study indicated the insufficient focus on policy-oriented studies, the inapplicability of the existing international studies to the particularity of NACs and the insufficiency of existing recommendations to direct policy at the national level (Khodr & Uherova Hasbani, 2013). The situation is not significantly different from other NACs where policy planning is not likely to follow an evidence-based approach (Bizri, 2018d).

The governance of science and technology at the national level is often characterized by a centralization approach in NACs (Khodr & Uherova Hasbani, 2013). A centralized system would benefit from the associated advantages like better interactions between system actors, stricter policy compliance, better allocation of costs and budget planning. Decentralized systems would benefit from the provided "autonomy" which supports scalability and effective development of capabilities and competencies. However, a hybrid system might be more effective in NACs where an inner layer hosts the main driving and central components and the outermost layer includes the regional and sectoral subsystems (Meuer, Rupietta, & Backes-Gellner, 2015), Table 1.

Table 1. Key Relevant Features of Policies and Strategies for Science, Technology and Innovation in NACs South Mediternean Countries

Country	S&T policy	Policy-making bodies with national authority (councils)	Dedicated ministry	Main funding mechanisms	Type of governance	GERD/GDP %
Algeria	Yes, a national plan was first established in 1998	-National Academy of Sciences (planned in 2015) -The National Commission for the Evaluation of Permanent Researchers (since 2000)	Ministry of Higher Education and Scientific Research	National Scientific Research and Technological Development Fund DGSRTD	Centralized	0.4*
Egypt	Yes, the first comprehensive strategy was	-Academy of Scientific Research and Technology (since	Ministry of Higher Education and Scientific	Science, Technology, Development Fund	Centralized	0.72

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

	established in 2005	1972)	Research	Academy of Scientific Research and Technology		
Jordan	Yes	-Higher Council for Science and Technology (since 1987)		-Higher Council for Science and Technology -The Industrial Scientific Research and Development Fund	Decentralized	0.4
Tunisia	Yes, available since 1977	-The National Agency for Scientific Research Promotion	Ministry of Higher Education and Scientific Research	The National Agency for Scientific Research Promotion	Centralized	0.6
Lebanon	Yes, available since 2006 (STIP)	-National Council for Scientific Research (since 1962) -Lebanese Academy of Sciences (since 2007)	Ministry of Education and Higher Education	National Council for Scientific Research	Decentralized	Unavailable
Morocco	Yes, available since 2006 (S&T vision)	-Hassan II Academy of Sciences and Technology since 2006	Ministry of Higher Education, Scientific Research, and Training	-Hassan II Academy of Sciences and Technology -InnovAct -National Agency for the Promotion of Small and Medium Enterprises.	Centralized	0.7*

Source: Updated version of (Hanafi & Arvanitis, 2015), *GERD is based on UNESCO Institute for Statistics (UIS) 2015

Most NACs have supporting specialized policies for renewable energy and the national strategies have listed ambitious targets (Figure 2). Some countries already have an implementation structure in place such as the Renewable Energy and Energy Efficiency Fund in Jordan. This fund does not only provide research and technology grants but also loans and specific mechanisms for small and medium-sized enterprises (SMEs). Jordan was the first country in the region to support a feed-in-tariff scheme for renewable energy. In Egypt, there are five specialized policies to support renewable energy, include funding mechanisms and incentive packages. However, the implementation pathways of these policies are still under discussion (Hadjipanayi et al., 2016), Figure 2.

Country	Target	Targeted PV capacity (year) [MWp]
Jordan	10% of the primary energy mix by 2020	300 (2020)
Saudi Arabia	50% of electricity from non-hydrocarbon resources by 2032	17,350 (2020; PV and CSP), 16,000 (2032; PV)
Egypt	20% of electricity generation by 2020 (of which 12% wind)	220 (2020), 700 (2027)
Morocco	42% of installed power generation capacity by 2020	2000 (2020; PV and CSP)
Kuwait	5% of electricity generation by 2020; 10% by 2030	3500 (2030)
United Arab Emirates	Dubai: 5% of electricity by 2030 Abu Dhabi: 7% of electricity generation capacity by 2020	No specific targets set
Israel	10% of electricity generation by 2020	1750 (2020; PV and CSP)

Figure 2. Overall renewable energy future targets and targeted PV capacity for selected MENA countries (Source : (Hadjipanayi et al., 2016)

Specialized food policies in NACs are challenged by the complex national prioritization processes that may be heavily prone to specific political economy considerations (Bizri, 2018a, 2018c). Egypt, Jordan, Morocco and Tunisia have started several attempts to streamline the United Nations' social development goals in their national strategies. In this context, Food and Agriculture Organization of the United Nations has declared in its 2017 "regional overview of food" the importance of developing and implementing joint action plans and strategies for sustainable management of water resources and adapting to the climate change impact on water and agriculture.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

The specialized national strategies on water in NACs are limited while the national policies for supporting the energy-food-water nexus approach are not sufficient. However, a "water" regional initiative is in place. The regional strategy for water security was developed by the Arab Ministerial Water Council in 2009 and resulted in a long-term program (2010-2030), as indicated in the (Arab Strategy for Water Security in the Arab region to meet the challenges and future needs for Sustainable Development 2010-2030, 2012).

3. Expenditure in research and development

Despite the existing budgetary pressure, governments remain the main funder of research and development in North African countries. Despite many national strategies in these countries to increase funding contribution by the industry and business sectors, this remains a major challenge (Malik & Awadallah, 2013). Some measures are already in place for mobilizing resources through public-private partnerships (Bizri, 2018d; Mansour & Kanso, 2017). However, organizational and regulatory frameworks for these measures are not considered enough to balance and incentivize this partnership while controlling the possible inherent effect from this practice, including possible limitations on open access and data sharing (Rezk, 2016; Radwan & Sakr, 2017). Public funding of research and development in all NACs are higher than 90% of Gross Domestic Expenditure on R&D (GERD) (Radwan & Sakr, 2017). In this context, France and Italy have been cited in literature as model examples since they have similar GERD percentage value of public funding to North African Countries (Aguiar & Gagnepain, 2017; The UNESCO Science Report: Towards 2030, 2015). However, the value of industry funding and funding from abroad in these European countries is a major differential factor (Aguiar & Gagnepain, 2017). This fact suggests that the allocation of a higher percentage of GDP in NACs for research and development should be accompanied by significant interventions to incentivize industry- academia collaboration and encourage private sector contribution in R&D (Akaev, Korotayev, Issaev, & Zinkina, 2016; Hamidi & Benabdeljalil, 2013).

GERD has increased steadily over the past decade in many countries in the region, however, it remains below 1% for all countries as indicated by the (Global Innovation Index, 2016). In general, GERD is considered low in North African Countries in the past three decades while being lower than the world average (Global Innovation Index, 2016; The UNESCO Science Report: Towards 2030, 2015). Thus, GERD percentage is being considered in this review to reflect only the state interest in science and technology and not in assessing research and innovation potentials or capabilities. Furthermore, the projection of R&D public funding per sector is not always clear in many NACs with a significant focus on a bottom-up approach. Nevertheless, agriculture, water, biological sciences, energy and medicine have the most focus in the region (Akaev et al., 2016; Bizri, 2018c). This pattern is linked to the relative shift in research policy agendas of these countries towards targeted societal challenges. From another prospective, this can also be further explained by the evident less focus, with respect to the reviewed policies and strategies, on internationally recognized research areas of global interest like big data, synthetic biology, artificial intelligence and smart factories. Moreover, the reviewed strategies and policies did not provide sufficient attention to themes like "citizen science" and "public engagement" in science and technology initiatives and activities (Table 2). Nevertheless, a large research infrastructure is foreseen to be supported in national strategies and is already prioritized (The UNESCO Science Report: Towards 2030, 2015). Furthermore, there is still a primary focus at the institutional levels on research excellence based on the constricted and routine definition in terms of the number of citations of articles published in leading journals (Radwan & Sakr, 2017). In this respect, some recommendations have been made by several authors to emphasize the relevance of research funding to the existing societal challenges in addition to research communication and exploitation activities, while considering also research excellence based on research citations and bibliometric measures (Amankwah-Amoah, 2016; Elshuraydeh, 2007). Table 2.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Table 2. Examples of Current National Policies for Science and Technology in North African Countries South Mediternean Countries

	Egypt	Jordan	Morocco	Algeria	Lebanon
Framework Policies and Strategies	-National Strategy for Science, Technology and Innovation covering the period of 2015-2030 -Knowledge pillar of Egypt's vision 2030 -Technology, Innovation and Entrepreneurship Strategy	-The National Policy and Strategy for Science, Technology and Innovation 2013-2017 -The National Innovation Strategy 2013-2017 -National Information and Communications Technology Strategy 2013-2017 -National Vision and Strategy for Jordan 2025	-National Strategy for the Development of Scientific Research (Horizon 2025) -Morocco Innovation Initiative -National Strategy for Information Society and Digital Economy, Digital Morocco 2013	-National Scientific Research Strategy 2008-2012 -National Scientific Research Strategy 2013-2017	-The Science, Technology and Innovation Policy (STIP) 2009 -Science, Technology and Innovation Policy Plan of Action
Target percentage of GERD from GDP	1%	1%	1% in the short term, 1.5% by 2025 and 2% by 2030	1%	1%

4. The evaluation and monitoring component of "science, technology and innovation" policies

While the lack of pragmatic sectorial policies and action plans could be considered a challenge, the absence of a regulatory component in any national science policy can stifle the scientific and technological process. At present, the evaluation and monitoring system of science and technology in NACs is, in most of the cases, carried out unsystematically by the governmental implementing bodies (Global Innovation Index, 2016; A. Radwan & M. Sakr, 2017; The UNESCO Science Report: Towards 2030, 2015). Most of the science and technology challenges can be faced by having an independent evaluation and optimization system that pinpoints real-time weaknesses and barriers during the implementation phases and suggests interventions and corrective actions when possible (Marxt & Brunner, 2013; Weinberg, 2011). Although this system is still missing in many north African countries' science and innovation strategies, it fits well within the many existing structures. Supporting the enforcement of relevant laws and local policies as well as a clear implementation plan of strategies are two integral components for having successful science, technology and innovation policies (A. Radwan & M. Sakr, 2017). These two components still need further support in the existing national strategies for science and technology. In general, it is widely agreed that having a national strategy without an implementation master plan with alternative pathways and technological roadmaps using clear policy instruments would jeopardize the efficacy and efficiency of the system and delay the local development process (Amankwah-Amoah, 2016; Intarakumnerd, Chairatana, & Tangchitpiboon, 2002). The Egyptian and Jordanian national strategies for STI is clearly defining ambitious objectives with relevant indicators (Table 3, Table 4). However, it remains important to allocate enough attention to the proper and dynamic evaluation and monitoring dimension (The UNESCO Science Report: Towards 2030, 2015).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Table 3. Strategic Objectives of Jordan National Science, Technology and Innovation Policy and Strategy (2013–2017)

Encourage the government and the scientific community to adopt the R&D priorities for developing a knowledge economy identified by the particular council and the Scientific Research Support Fund in 2010 in Defining Scientific Research Priorities in Jordan for the Years 2011–2020;
Generalize a science culture in the education system;
Harness R&D to promote development;
Build knowledge networks in science, technology and research;
Adopt innovation as a key stimulus for investment opportunities;
Translate the results of R&D into commercial ventures; and contribute to excellence in training and skills acquisition.

Table 4. Strategic Objectives of Egypt National Science, Technology and Innovation Policy and Strategy 2017

1. Creating and stimulating a supportive environment for research, scientific production and innovation;
1.1 Enhance the governance of research and innovation and develop specific and sectorial science policies
1.2 Further develop the scientific base of Egypt, including infrastructure and human resources
1.3 Give special support to basic and social sciences in addition to research foresight
1.4 Stimulate industry-academia collaboration
1.5 Support science and society fields and enhance international cooperation.
2. Technology development and transfer in energy, health, food and agriculture, future technologies and Egypt's industrial strategic focus which include textiles, therapeutics, metallurgy, chemical industry, electronics, information communication technologies and deepening local manufacturing.

Several NACs have taken appropriate measures to establish national observatories in the past decade with the aim of monitoring trends and indicators in science and technology. National observatories in Egypt, Jordan, Lebanon, Palestine and Tunisia receive support from the government (ELshuraydeh, 2007; The UNESCO Science Report: Towards 2030, 2015). Lebanon, through the National Council for Scientific Research (CNRS), is actively planning to put in place a Lebanese Science Technology and Innovation Observatory (LORDI). A regional observatory has been planned since 2014 by UNESCO and the Arab League Educational, Cultural and Scientific Organization (ALESCO). This regional observatory aims to support the Arab region in boosting measures for integration in science and technology, and to coordinate activities between national observatories, in addition to allocating a digital hub for information sharing. However, this regional observatory is still under development as indicated by (The UNESCO Science Report: Towards 2030, 2015). Only few countries, including Egypt and Lebanon, have performed national innovation surveys following Organization for Economic Co-operation and Development (OECD) methodological definition. The innovation survey became an integral part of the operation of Egypt's National Observatory of Science and Technology.

Meanwhile, thematic observatories of science and technology started to spread during the past decade in the South Mediterranean countries (SMC). The heterogeneity nature of most of these thematic observatories, being established at different levels and scales, might hinder the integration and sustainability approach (ELshuraydeh, 2007; The UNESCO Science Report: Towards 2030, 2015). These observatories are established by either an academic institution, public authority, regional programs, international agencies or as a result of a funded project. The Egyptian Food Observatory issues have been published by the World Food Programme between 2011 and 2013 on a quarterly basis. On the other front, the two observatories in Morocco are funded by EU's French and Spanish academic partners (French National Research Institute for Sustainable Development (IRD), Oceanographic Centre of the Canaries), while UNESCO supports the Arab Water Observatory in Egypt. Many Lebanese thematic observatories were established through EU funded projects (Bamyeh, 2015; Elshuraydeh, 2007).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

5. Challenges and opportunities within the regional dimension of STI policies

There are several strategies and ideas for policy action and initiatives being published worldwide that focus on the potentiality of the recent growth dynamics in NACs. In NACs, science education, knowledge development and scientific research have been always considered in national development plans (Akaev et al., 2016; Malik & Awadallah, 2013).

Over the past decade, several NACs have moved from one political regime to another under similar circumstances and multiple driving forces. These changes are often accompanied by evolution of relevant policies in science, technology and innovation (Bizri, 2018e). It has been commonly agreed that effective science policy requires the engagement of relevant stakeholders, including industry, civil societies and research institutions (Akaev et al., 2016; Malik & Awadallah, 2013). The type of engagement varies among NACs, where some countries focus on stakeholders' engagement in the formulation of science policies and very few others focus on their engagement in the implementation phases.

However, the chances for structural development and transformation have been defied by the emerging political and socioeconomic challenges (Malik & Awadallah, 2013). Discussions about Arab development problems and perspectives are prevailing in literature and strategic reports. Challenges in the field of science and technology vary among Arab countries and also between South and North Mediterranean countries. Yet, while both regions have been subject to reform pressures, the outcomes of change have been strikingly different (Bizri, 2018d). While science policies are designed, and agreed at the regional and national levels, regional integration is generally considered as an obvious challenge facing NACs (Elshuraydeh, 2007; Malik & Awadallah, 2013). Effective implementation of strategies is also a clear challenge for North African countries where the lack of effective coordination among different stakeholders is persistent and-strategies are usually not binding to national actors (Radwan & Sakr, 2017). In this respect, local authorities in Arab countries are facing several obstacles such as boosting collaboration with other stakeholders. The negative aspects of the pivotal role of local authorities are also related to their spatial proximity and the risk of developing nepotism and clientelism (Akaev et al., 2016).

Despite the growing number of universities in the NAC region, the public sector still dominates the scene especially with regard to research institutions. Moreover, the private sector tends to be education-oriented but plays a prominent role in Egypt and Lebanon (Elshuraydeh, 2007; Mansour & Kanso, 2017). As an exception, Tunis and Morocco have a relatively larger private research sector. In addition, Morocco has the biggest share of private higher education institutions among the NACs (Bizri, 2018d; Mansour & Kanso, 2017). R&D priority setting in higher education establishments as well as strengthening collaboration with the industry sector were given marginal consideration in the early 1990's (Kearns, 1992). Sectorial and specialized research centers were established in the region in the 1970s while having the government as the main beneficiary. In this respect, the focus areas were the food, energy, water and health sectors. More recently, the focus has expanded to biotechnologies, microelectronics and nanotechnologies (Bizri, 2018d). During the past two decades, several organizations further evolved to support innovation activities and technology transfer like the Centre for the Development of Renewable Energies (CDER) in Algeria, the Institute of Agricultural Research and Higher Education (IRESA) in Tunisia as well as Nile University and Zewail City for Science and Technology in Egypt. Public-private partnership is sufficiently tackled in relevant policies in all NACs. Few countries, though, have translated these policies into concrete actions and instruments (Bizri, 2018b; Mansour & Kanso, 2017). As an example, Egypt has dedicated a nationwide financial scheme in 2015 to support public-private clusters with a special focus on textiles, renewable energy, water desalination and management, agri-food and smart factory as well as deepening local manufacturing in the petrochemicals and chemistry industry. The Egyptian-established clusters involve more than 135 companies, 18 local authorities and municipalities, 20 NGOs and 55 public and private research institutions. The Egyptian model has some similarities with the "Morocco Innovation Initiative

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Clusters". So far nine clusters have been established under this initiative in Morocco, including energy efficiency, textiles, food, electronic and mechanics, microelectronics and information technology and communication (Bizri, 2018d; Hamidi & Benabdeljalil, 2013).

The (Akaev et al., 2016) has identified in its latest edition the lack of acquisition, absorption and use of knowledge as the three main problems that limit human development in NACs. The lack of cooperation between the private sector and universities is still widespread in the NAC region and clearly a barrier to a sustainable innovation system (Elshuraydeh, 2007; Malik & Awadallah, 2013; Ramadan & Rezk, 2016).

Changing this requires both interventions at the policy level of the countries and a new strategic approach given that innovation is still largely dominated by major multinational groups(Abdelbary & Benhin, 2018). Only Lebanon and Algeria have achieved good progress during the past decade in enhancing university-industry collaboration in R&D (
Figure 2). Jordan has been in a static position since 2014, while countries like Morocco, Tunisia and Egypt have experienced a decrease in such collaboration. It is quite clear that corporate collaboration is one of the weakest points in NACs research capacities (Bizri, 2018c; Amr Radwan & Mahmoud Sakr, 2017). An average of 0.8% of total scientific productivity in all NACs was based on corporate collaboration in the last 5 years (Bizri, 2018c; Mohamed Ramadan A.Rezk, 2016). It shows also the insignificance of existing mechanisms in linking industry and academia, and underscores the need for new programs and initiatives to encourage such collaboration (Table 5).

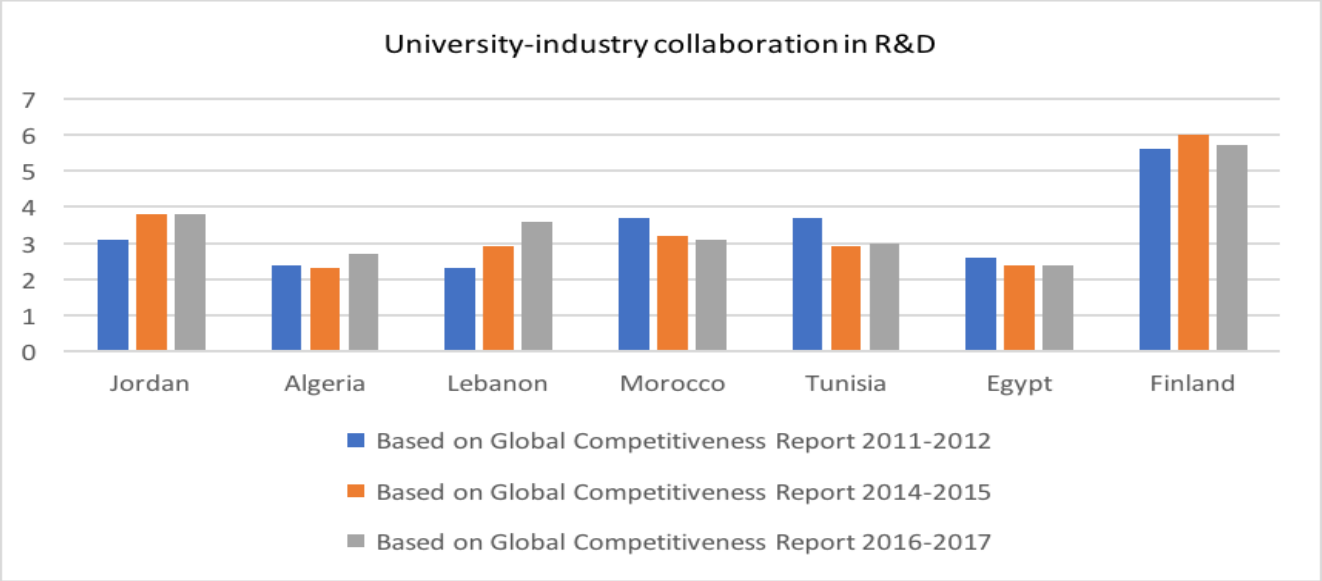


Figure 2. University-industry cooperation in NACs with a comparative highly ranked country. Source: Data derived from Global Competiveness Index

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Table 5. Common STI Policy-related Challenges in NACs that Require Policy Interventions

Common STI policy-related challenges facing NACs	**Source**
Gap between policies and implementation in addition to the poor uptake of research evidence by policymakers.	(Bizri, 2018e; Hanafi & Arvanitis, 2015)
Private funds in research and development are limited due to insufficient incentives and supportive measures.	(Akaev et al., 2016; ELshuraydeh, 2007; Khodr & Uherova Hasbani, 2013; A. Radwan & M. Sakr, 2017)
Lack of institutional focus on research priorities and strategies, especially when aligned with national strategic objectives.	(Bizri, 2018e; Hamidi & Benabdeljalil, 2013; Khodr & Uherova Hasbani, 2013)
Insufficient overall public funding to meet identified goals.	(ELshuraydeh, 2007; Hanafi & Arvanitis, 2015)
Ineffective enforcement of intellectual property rights law.	(Hanafi & Arvanitis, 2015; A. Radwan & M. Sakr, 2017)
Curtailed industry-academia collaboration in science and technology.	(ELshuraydeh, 2007; Mansour & Kanso, 2017)
Weak engagement of stakeholders in policy settings.	(Bizri, 2018e; Hamidi & Benabdeljlil, 2015; Mansour & Kanso, 2017)
Insufficient networking and clustering of competencies at the national and regional levels.	(Bizri, 2018c; ELshuraydeh, 2007; A. Radwan & M. Sakr, 2017)
Limited collaborative activities in research and innovation at the national level.	(Khodr & Uherova Hasbani, 2013; A. Radwan & M. Sakr, 2017)
Insufficient measures to control brain drain.	(Geber, 2013; Gonzalez & Chakraborty, 2014; Lucas, 2015)
Data-reliability for evaluation and monitoring of research performance	(Khodr & Uherova Hasbani, 2013; A. Radwan & M. Sakr, 2017)
Limited technological absorption capacity of the industry with the existence of a large informal business sector.	(Hamidi & Benabdeljlil, 2015; Mohamed Ramadan A.Rezk, 2016)
Insufficient funding and support to research infrastructure.	(ELshuraydeh, 2007; A. Radwan & M. Sakr, 2017)
An ineffective recruitment policy in academic institutions that doesn't sufficiently retrain talents or recruit highly qualified researchers.	(Abdelbary & Benhin, 2018; Elrehail, Emeagwali, Alsaad, & Alzghoul, 2018; Hanafi & Arvanitis, 2015)
Limited awareness about existing capabilities and competencies with insufficient utilization of the existing research and innovation public infrastructure.	(ELshuraydeh, 2007; A. Radwan & M. Sakr, 2017)
Lack of awareness about market needs and the mismatch between the supply of and demand for skills within the labor market.	(Abdelbary & Benhin, 2018; Elrehail et al., 2018)

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

6. Discussion and conclusion

The findings of this review suggest that the existing reforms and development of the STI system in NACs require reorientation towards a higher socioeconomic relevance and innovation focus accompanied by legislative measures, adequate monitoring and evaluation tools as well as effective engagement of relevant stakeholders while leveraging sufficient strategic investments. The highly-centralized structure within the STI system in NACs might hinder long-term development plans. Despite the existence of overarching bodies, coordination among the main actors of the innovation ecosystem seems insufficient. It is also clear that excellence in research and innovation in NACs will not happen without a conducive ecosystem associated with a set of supporting measures in policies-related enforcement actions linked to the relevant R&D incentives. Linking national strategies with institutional settings is crucial for an effective realization of the desired goals and outputs.

This review indicates also the growing overlapping and less synergistic measures among local actors, including research institutions at the national and regional levels. Bilateral or multilateral research projects among NACs remain extremely rare. Actions to foster specialized and interdisplinary networks need to be more fostered in NACs. The notion of innovation clusters need to be widely promoted and accompanied by sufficient operation mechanisms. In this respect, it is worth mentioning that some NACs, including Egypt and Tunisia, have developed mechanisms to foster technology transfer and public-private partnerships. Nevertheless, these interventions need to be scaled up and further developed to meet the existing gaps. Indeed, inadequate funding for research and development remains a challenge, though not necessary considered the top barrier when compared to ecosystem challenges like research governance and alignment of adequate policies and strategies.

In this respect, it is important to highlight that several stakeholders, including civil societies, should be involved in the development process of policies through focused consultative processes. The responsibility of implementing and monitoring policies should not be assigned to one party, such as a ministry of higher education and scientific research or a higher council for science and technology, as is the case in several NACs. In general, it is widely agreed that having a national strategy without an implementation master plan with alternative pathways and technological roadmaps, using clear policy instruments, would jeopardize the efficacy and efficiency of the system and delay the local development process. The responsibility must be shouldered by planning ministries and inter-ministerial committees led by the highest levels of the political pyramid. These recommendations shall not to be treated as isolated interventions and should be integrated into a joint action plan.

References

Abdelbary, I., & Benhin, J. (2018). Governance, Capital and Economic Growth in the Arab Region. *The Quarterly Review of Economics and Finance* https://doi.org/10.1016/j.qref.2018.04.007

Aguiar, L., & Gagnepain, P. (2017). European cooperative R&D and firm performance: Evidence based on funding differences in key actions. *International Journal of Industrial Organization, 53* (Supplement C), 1-31. https://doi.org/10.1016/j.ijindorg.2016.12.007

Akaev, A., Korotayev, A., Issaev, L., & Zinkina, J. (2016). Technological development and protest waves: Arab spring as a trigger of the global phase transition? *Technological Forecasting and Social Change*. http://dx.doi.org/10.1016/j.techfore.2016.08.009

Amankwah-Amoah, J. (2016). The evolution of science, technology and innovation policies: A review of the Ghanaian experience. *Technological Forecasting and Social Change, 110*, 134-142. https://doi.org/10.1016/j.techfore.2015.11.022

Arab Strategy for Water Security in the Arab region to meet the challenges and future needs for Sustainable Development 2010-2030. (2012). Cairo: Arab Ministerial Water Council Retrieved from http://www.accwam.org/Files/Arab_Strategy_for_Water_Security_in_the_Arab_Region_to_meet_the_Challenges_and_Future_Needs_for_Sustainable_Development_-_2010-2030.pdf

Ayad, Y. (2015). Egypt 2020 and 2030: Future Vision and Prospective State. *The Arab World Geographer, 18*(1-2), 39-44. https://doi.org/10.5555/1480-6800.18.1.39

Bamyeh, M. (2015). Social Sciences in the Arab World, Arab Social Science Monitor. Retrieved from http://www.theacss.org/uploads/English-ASSR-2016.pdf

Bizri, O. F. (2018a). Chapter 2 - The Arab Countries' Economies and Development Policies Science, Technology, Innovation, and Development in the Arab Countries (pp. 11-110): Academic Press. https://doi.org/10.1016/B978-0-12-812577-9.00002-7

Bizri, O. F. (2018b). Chapter 3 - Science, Technology, and Innovation Policies and Institutional Landscapes Science, Technology, Innovation, and Development in the Arab Countries (pp. 111-361): Academic Press. https://doi.org/10.1016/B978-0-12-812577-9.00003-9

Bizri, O. F. (2018c). Chapter 4 - Research Output by the Arab Countries Science, Technology, Innovation, and Development in the Arab Countries (pp. 363-453): Academic Press. https://doi.org/10.1016/B978-0-12-812577-9.00004-0

Bizri, O. F. (2018d). Chapter 5 - Innovation and Entrepreneurship in the Arab Countries Science, Technology, Innovation, and Development in the Arab Countries (pp. 455-502): Academic Press. https://doi.org/10.1016/B978-0-12-812577-9.00005-2

Bizri, O. F. (2018e). Chapter 6 - Arab Science, Technology, and Innovation Systems: Challenges, Policy Regimes, and Future Directions Science, Technology, Innovation, and Development in the Arab Countries (pp. 503-569): Academic Press. https://doi.org/10.1016/B978-0-12-812577-9.00006-4

Elrehail, H., Emeagwali, O. L., Alsaad, A., & Alzghoul, A. (2018). The impact of Transformational and Authentic leadership on innovation in higher education: The contingent role of knowledge sharing. *Telematics and Informatics, 35*(1), 55-67. https://doi.org/10.1016/j.tele.2017.09.018

Elshuraydeh, K. (2007). *Science, Technology and Innovation Profile of Jordan; Evaluation of science, technology and innovation capabilities in the Mediterranean countries*. Retrieved from http://www.idaea.csic.es/sites/default/files/Final_report_Jordan_IM_RA.pdf

Geber, H. (2013). Can Mentoring Decrease the Brain drain of Academics from Africa? *Procedia - Social and Behavioral Sciences, 93*, 215-220. http://dx.doi.org/10.1016/j.sbspro.2013.09.180

Global Innovation Index. (2016). Retrieved from

Gonzalez, J. A., & Chakraborty, S. (2014). Expatriate knowledge utilization and MNE performance: A multilevel framework. *Human Resource Management Review, 24*(4), 299-312. http://dx.doi.org/10.1016/j.hrmr.2014.03.001

Hadjipanayi, M., Koumparou, I., Philippou, N., Paraskeva, V., Phinikarides, A., Makrides, G., Georghiou, G. E. (2016). Prospects of photovoltaics in southern European, Mediterranean and Middle East regions. *Renewable Energy, 92*(Supplement C), 58-74. https://doi.org/10.1016/j.renene.2016.01.096

Hamidi, S., & Benabdeljalil, N. (2013). National Innovation Systems: The Moroccan Case. *Procedia - Social and Behavioral Sciences, 75*, 119-128. https://doi.org/10.1016/j.sbspro.2013.04.014

Hamidi, S., & Benabdeljlil, N. (2015). Managerial and Technological Innovations: Any Relationship? *Procedia - Social and Behavioral Sciences, 181*, 286-292. https://doi.org/10.1016/j.sbspro.2015.04.890

Hanafi, S., & Arvanitis, R. (2015). Knowledge Production in the Arab World: The Impossible Promise (Routledge Advances in Middle East and Islamic Studies) 1st Edition

Intarakumnerd, P., Chairatana, P.-a., & Tangchitpiboon, T. (2002). National innovation system in less successful developing countries: the case of Thailand. *Research Policy, 31*(8), 1445-1457. https://doi.org/10.1016/S0048-7333(02)00074-4

Kearns, K. P. (1992). Innovations in local government: A sociocognitive network approach. *Knowledge and Policy, 5*(2), 45-67. https://doi.org/10.1007/BF02692805

Khodr, H., & Uherova Hasbani, K. (2013). The dynamics of energy policy in Lebanon when research, politics, and policy fail to intersect. *Energy Policy, 60*(Supplement C), 629-642. https://doi.org/10.1016/j.enpol.2013.05.080

Lucas, R. E. B. (2015). African Migration. *Handbook of the Economics of International Migration, 1*, 1445-1596. http://dx.doi.org/10.1016/B978-0-444-53768-3.00026-6

Malik, A., & Awadallah, B. (2013). The Economics of the Arab Spring. *World Development, 45*, 296-313. http://dx.doi.org/10.1016/j.worlddev.2012.12.015

Mansour, A. M. H., & Kanso, L. (2017). Science park implementation – A proposal for merging research and industry in developing Arab countries. *HBRC Journal*. https://doi.org/10.1016/j.hbrcj.2017.06.002

Marxt, C., & Brunner, C. (2013). Analyzing and improving the national innovation system of highly developed countries — The case of Switzerland. *Technological Forecasting and Social Change, 80*(6), 1035-1049. https://doi.org/10.1016/j.techfore.2012.07.008

Melas, V.; Lisin, E.; Tvaronavičienė, M.; Peresadko, G.; Radwański, R. 2017. Energy security and economic development: renewables and the integration of energy systems. *Journal of Security and Sustainability Issues,* 7(1), 133-139. https://doi.org/10.9770/jssi.2017.7.1(11)

Meuer, J., Rupietta, C., & Backes-Gellner, U. (2015). Layers of co-existing innovation systems. *Research Policy, 44*(4), 888-910. https://doi.org/10.1016/j.respol.2015.01.013

Mohamed Ali, T. (2014). Post-political Transitions in Arab Spring Countries: The Challenges. *Procedia - Social and Behavioral Sciences, 109*(Supplement C), 250-256. https://doi.org/10.1016/j.sbspro.2013.12.454

Rezk, M. A.; Ibrahim, H. H.; Radwan, A.; Sakr, M. M.; Tvaronavičienė, M.; Piccinetti, L. 2016. Innovation magnitude of manufacturing industry in Egypt with particular focus on SMEs. *Entrepreneurship and Sustainability Issues,* 3(4), 307-318. https://doi.org/10.9770/jesi.2016.3.4(1)

Radwan, A.; Sakr, M. M. 2017. Review of Egypt Science and Technology System: SWOT analysis. *Entrepreneurship and Sustainability Issues,* 5(2), 204-211. https://doi.org/10.9770/jesi.2017.5.2(3)

Schiffer, A.; Swan, A. 2018. Water security: a summary of key findings exploring islands in Brazil. *Journal of Security and Sustainability Issues,* 7(4), 855-860. https://doi.org/10.9770/jssi.2018.7.4(20)

Strielkowski, W.; Lisin, E.; Tvaronavičienė, M. 2016. Towards energy security: sustainable development of electrical energy storage. *Journal of Security and Sustainability Issues*, 6(2), 43–52. http://dx.doi.org/10.9770/jssi.2016.6.2(4)

The UNESCO Science Report: Towards 2030. (2015). Retrieved from http://unesdoc.unesco.org/images/0023/002354/235407e.pdf

Tvaronavičienė, M. 2018. Towards sustainable and secure development: energy efficiency peculiarities in transport sector. *Journal of Security and Sustainability Issues,* 7(4), 719-725. https://doi.org/10.9770/jssi.2018.7.4(9)

Tvaronavičienė, M.; Nesterova, K.; Kováčik, V. 2017. Energy security and long-term energy efficiency: case of selected counties. *Journal of Security and Sustainability Issues,* 7(2), 349-357. https://doi.org/10.9770/jssi.2017.7.2(14)

Tvaronavičienė, M.; Tarkhanova, E.; Durglishvili, N. 2018. Sustainable economic growth and innovative development of educational systems. *Journal of International Studies,* 11(1), 236-244. https://doi.org/10.14254/2071-8330.2018/11-1/19

Weinberg, B. A. (2011). Developing science: Scientific performance and brain drains in the developing world. *Journal of Development Economics, 95*(1), 95-104. https://doi.org/10.1016/j.jdeveco.2010.05.009

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(17)

Acknowledgement

This work received support from a project 5TOI_4EWAS (Energy, Water and Agriculture in the South Mediterranian Neigbourhood) co-funded by the Horizon 2020 Framework Programme of the European Union under Grant Agreement n° 692523

Short biographical note about the contributors

Amr RADWAN is the Head of Research and Innovation Management Department at the Egyptian Academy of Scientific Research & Technology (ASRT). Amr has a number of published papers and reports in the area of innovation management, research governance, science policy and evidence-based medicine, and co-authored several strategies for S&T. Before joining the Academy of Scientific Research in Egypt, he was a researcher at Unipharma pharmaceutical corp., where he also founded its process innovation unit. He has a pharmacology background with professional industry experience and has also obtained a Masters of Business Administration (MBA) and a number of diplomas in Intellectual Property Rights and Innovation Management.

ORCID ID: orcid.org/0000-0002-9667-3730

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Publisher
http://jssidoi.org/esc/home

QUALITY MANAGEMENT SYSTEM FOR IMPROVEMENT OF QUALITY AND EFFICIENCY OF FOOD PRODUCTION: CASE OF DAIRY PRODUCTS ENTERPRISE*

Saule Ospandiyarovna Akhmetova[1], Mariya Shayahmetovna Suleimenova[2]

[1,2] Almaty Technological University, Tole bi street 100, Almaty 050012, Republic of Kazakhstan

E-mails:[1] sunrise_kz@mail.ru; [2] s.mariyash@mail.ru

Received 15 March 2018; accepted 10 July 2018; published 30 September 2018

Abstract. On the basis of the conducted researches the strategic directions of development of the enterprise are scientifically based. The conceptual principles of creation and functioning of processes at Fudmaster Company JSC are formulated and the structural model of network of processes is created. The functional model and the mechanism of creation of process including its identification, formation, management and improvement are developed. The possibility of use of scientific methodology of FMEA analysis in technology of preparation of production "Kefir from Fudmaster" is shown. On the basis of the offered scientific and methodical approach the process of the production of fermented milk product "Kefir from Fudmaster" is structured. The standard of the organization for formation of processes of dairy production is developed and evidence-based.

Keywords: quality management system; process; process approach; milk and dairy products; verification; measuring tools; monitoring; controlling

Reference to this paper should be made as follows: Akhmetova, S. O.; Suleimenova, M.S. 2018. Quality management system for improvement of quality and efficiency of food production: case of dairy products enterprise, *Enterpreneurship and Sustainability Issues* 6(1): 289-310. http://doi.org/10.9770/jesi.2018.6.1(18)

JEL Classifications: L15, L23, L66, M11, Q01, Q13, Q18

Additional disciplines (besides field of economics reflected in JEL classifications): Chemical Engineering and Ecology.

1. Introduction

With creation of the Eurasian Customs Union for the Kazakhstan food industry enterprises the most relevant has become a question of increase in competitiveness of production. Nowadays the high competition of the foreign

* *This research was supported by the project, which has received funding from the Ministry of Education and Science of the Republic of Kazakhstan, the Grant of a Scientific Project on the theme "Monitoring and optimization of food safety based on innovative nanotechnologies" (2015-2017, state registration number is 0115RK01777)*

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

companies, delivering food products to Kazakhstan market and low competitiveness of domestic production in foreign market create serious economic and social problems. That is why our domestic manufacturers have to make use the best international and domestic practices on improvement of the organization of production and introduce the international systems of management.

The dairy industry - one of the most dynamically developing food branches of the Republic of Kazakhstan which is continuously introducing advanced technologies and the equipment, methods and control devices. However in the conditions of increase of competition it is necessary to improve first of all the mechanism of management, to reduce expenses and prime cost, using modern methods of quality management.

The perspective direction when making solution of a problem of improvement of quality and competitiveness of dairy products is creation, introduction and improvement of a quality management system according to requirements of the ST RK ISO 9001-2016 standard. The system allows to exercise quality management at all stages, beginning from business-to-business marketing research and establishment of requirements to quality, including development of dairy products, production and logistic processes, preparation of production, and finishing with shipment and delivery it to the consumers.

Not at all systems of quality management introduced at the enterprises for production of dairy products in a due measure there is a key element - the process focused approach. Advantage of use of the process model is the continuity of management on joints of separate functions, constant measurement of key parameters in control points of a subsystem of monitoring, assessment of effectiveness of the process and efficiency of use of resources.

The relevant and perspective direction in dairy branch is creation of scientific methods of improvement of quality and efficiency of production on the basis of basic principle of management system - the process focused approach.

The purpose of the work is increase in efficiency of dairy production by introducing of the process focused approach, monitoring and controlling, SWOT analysis, FMEA analysis. For achievement of the purpose the following objectives have been set:
- To carry out the analysis of information sources and, using SWOT analysis, to define the strategic directions of development of the dairy enterprise;
- To investigate activity of the dairy enterprise and to reveal a supply line of the main processes providing quality of finished goods;
- To investigate the main production of the dairy enterprise, to define indicators, to create subsystems of monitoring and controlling;
- To reveal efficiency of application of the FMEA analysis for improvement of quality of processes in the dairy industry.

2. Literary Review. The Process Approach is the Basis of a Quality Management System of Dairy Enterprise

Success of the dairy enterprise is based on high and reliable quality of products. However, to meet the requirements put by consumers it is necessary to organize quality of all activity of the company. This quality has to be checked not only at the end of production process, but to be the planned, systematic link of all activity of the enterprise (ST RK ISO 9004-2010 (IDT, ISO 9004-2009); Evans James R., 2007; Costa A.I.A., Dekker M., Jongen W.M.F., 2001; Akhmetova, S.O., Fuschi, D. L., Vasiliūnaitė, R., 2017).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

System approach in the work on ensuring quality will give the chance to develop the new mechanisms of interaction of processes meeting requirements of the ISO international standards of a series 9000. It means that the products which are turned out by the dairy enterprise will correspond to necessary levels of quality and safety (Avstriyevsky A.N., Kantare V.M., Surkov I.V., 2007; Bart T.V., 2007). Introduction of the process approach and therefore, creation of network of processes is the requirement of ST of RK ISO 9001-2016. Process approach is a basis of this standard (ST RK ISO 9001-2016; Repin V.V., Eliferov V.G., 2006; Shadrin A., 2006; Sharipov S.V., 2004).

The management of the enterprise for production of dairy products has to have the regular processed information on activity of QMS, responsibility for which is born by service of quality which provides the sequence of transactions of the analysis of QMS by the top management of the enterprise (fig. 1) (Lafta J.K., 2007; Tereshchenko N.V., Yashin H.C. 2006; Akhmetova S.O., Aliyeva G.B., 2013).

What gives to the enterprise introduction of QMS? Here that V.Ya. Belobragin in the book "Quality: lessons of the past and present" about it writes (Belobragin V.Ya., 2003): "First, the trust of consumers increases, the competitiveness of production increases and its entry into foreign market is facilitated. Secondly, conditions for successful participation in competitions on the conclusion of government contracts, in tenders for receiving investments, for receiving an award and an award in the field of quality are facilitated (E. Deming, M. Boldridzh, European, national, etc.). Thirdly, there is a possibility of marking of production the Mark of conformity, and it is additional advertizing of production. Fourthly, safety of work of production personnel due to its qualification and competence, the culture of production, stable operation of the equipment and technical processes increases. Fifthly, economic losses from application in production of the faulty equipment, equipment, measuring instruments, from realization of substandard production, claims decrease".

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

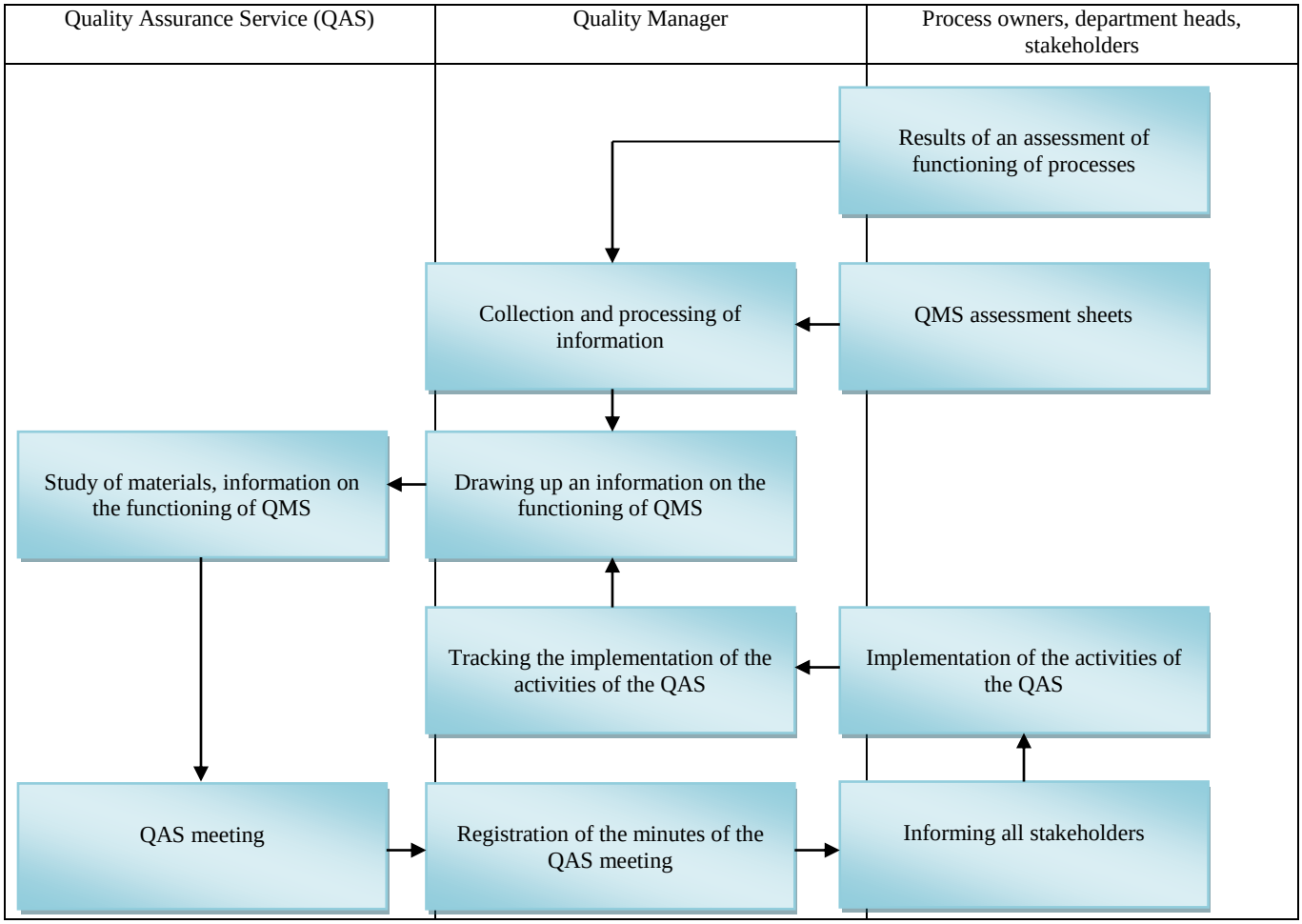


Fig.1. Scheme of the sequence of transactions on the analysis of QMS by the management

Source: Lafta J.K. (2007)

Activity of any organization consists of numerous processes. Therefore effectively to function, the organizations have to define and operate the numerous interconnected and interacting processes (Goryacheva E.D., Maximova N.V., 2008; Akhmetova S.O., Kulazhanova A.M., 2013; Tvaronavičienė M., Tarkhanova E., Durglishvili N., 2018). Approach as a process promotes ability of the organization to define and realize the kinds of activity, degree of their interrelations and independence. It allows to operate these kinds of activity more effectively.

Process transforms an entrance to an exit by means of use of mechanisms (resources) regulated by means of management. The entrance, management (procedure) and exit can be material or non-material. The corresponding tools can be applied to collection of information and data for the analysis of the process work and characteristics of input and output. (Aksenov N.M., 2005). The main benefit at application of process approach is the solution of interfunctional problems (destruction of invisible barriers) between divisions. (Repin V.V., Eliferov V.G., 2006).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Improvement of the process - constants, cyclically repeating actions directed to increase in its effectiveness and efficiency. These actions include, first of all performance of stages of a cycle PDCA (Deming Cycle): planning of the improvements, implementation of measures for improvement, check of the results, widespread introduction of the positive experience and gained knowledge.

The basic model of the process is used for emphasis of an attention on requirements imposed to the process and the measurements necessary for assessment of an extent of implementation of these requirements (fig. 2).

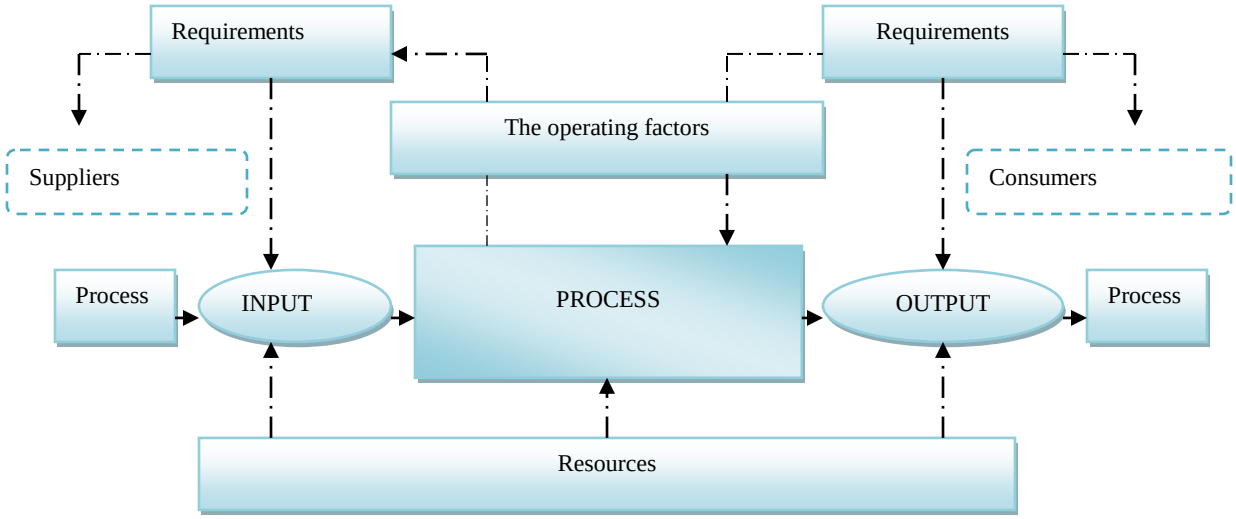


Fig.2. Model of the process of QMS

Source: John Holah, Domagoj Gabric (2016)

In the process all those actions which are necessary for performance of the purpose of the process, obtaining its result are carried out. Often such actions represent the strict sequence which can be represented in the form of a process algorithm. Such model is also used for identification of areas where it is possible to bring improvement in the process and its result (H.L.M. Lelieveld, John Holah, David Napper, 2014; H.L.M. Lelieveld, John Holah, Domagoj Gabric, 2016).

It is told about advantages of the process approach in (Schuster M.M., 2006): "among the primary benefits of such approach it is possible to select simplicity of carrying out optimization as the processes, from the point of view of their organization, synchronization, interconsistency, and also resources consumed by the processes.

The main advantages of process approach:
- Processes of the enterprise are beyond the functions which are carried out by structural divisions. Therefore the process scheme of management is more effective, than functional as it isn't limited to a framework of structure;
- Processes are subject to the description and are tightly regulated. Thereof it is much easier to exercise control, verification and validation of processes, than structural divisions.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

3. Research methods and objectives. Analysis of efficiency of the operating Quality Management System of "Fudmaster Company" JSC

2.1 Ensuring of production and processes quality at the "Fudmaster Company" JSC.

The Fudmaster Company is the leader in production of dairy products in the market of Kazakhstan. It is the first Kazakhstan food company which in 2001 has begun to introduce a quality management system of ISO and has received the certificate in 2004 of the Body for Certification of TUV CERT of technical supervising society TUV NORD CERT GmbH & Co. KG No. 78 100 6181 from 12/20/2014. Since 2004 the Fudmaster Company is included into the international Laktalic group (France) - the leader in production of high-quality dairy products in the world uniting over 200 enterprises in the different countries of the world (http://www.foodmaster.kz; Quality manual. "Fudmaster Company" JSC, 2016). At the dairy plant work the certified sanitary and chemical and microbiological laboratories of internal control. To achieve desirable result, the company fully works according to the international ISO 9001:2000 standard.

Quality Management System of the "Fudmaster Company" JSC has to have a confirmed ability of the processes to reach of the planned results. The products have to meet the requirements of normative documents and wishes of consumers. The solution of this problem is carried out by means of creation of a subsystem of monitoring and measurement of processes (Rodionova Yu.A., 2013). The flowchart of a subsystem is provided on fig. 3.

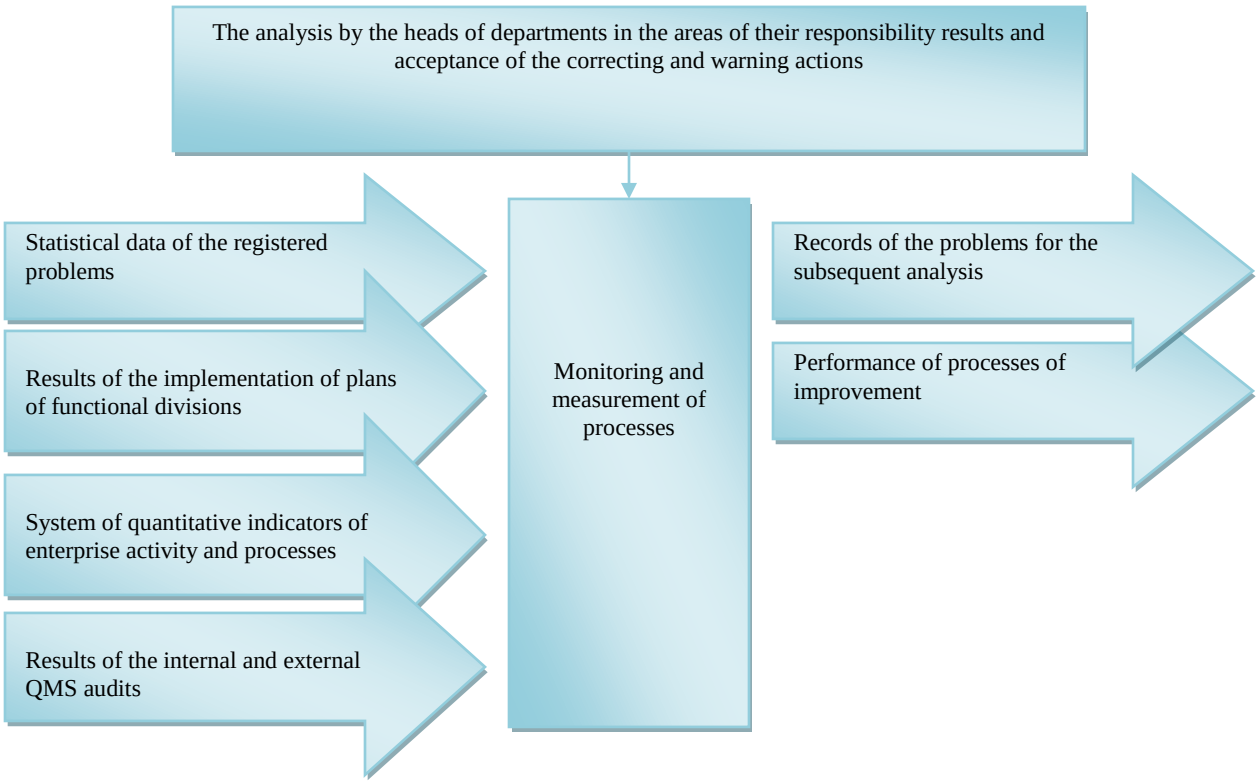


Fig. 3. Flowchart of a subsystem of monitoring and measurement of processes

Source: composed by the authors

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

At the enterprises for production of milk and dairy products monitoring of production (from the entrance control of raw materials to quality control of finished goods), raw materials and materials, processes of production of dairy products and semi-finished products, the measuring equipment used by production, tests of dairy products and entrance control of raw materials is carried out. (ST RK 1733-2015; ST RK 1734-2007; Technical Regulations of the Customs Union 021/2011; SanPiN No. 611 8/6/2010; Matison V.A., Tikhimirov I.A., 2007; Akhmetova S.O., Aliyeva G.B., 2013).

Quality control covers all stages of life cycle of production and at its carrying out all necessary parameters are controlled. In this regard on dairy production different types of quality control are used: entrance, operational and acceptance control (Hoyle, David, 2007*;* Bettina, Warzecha, 2017).
In fig. 4 the flowchart of acceptance of milk raw materials on "Fudmaster Company" JSC is presented.

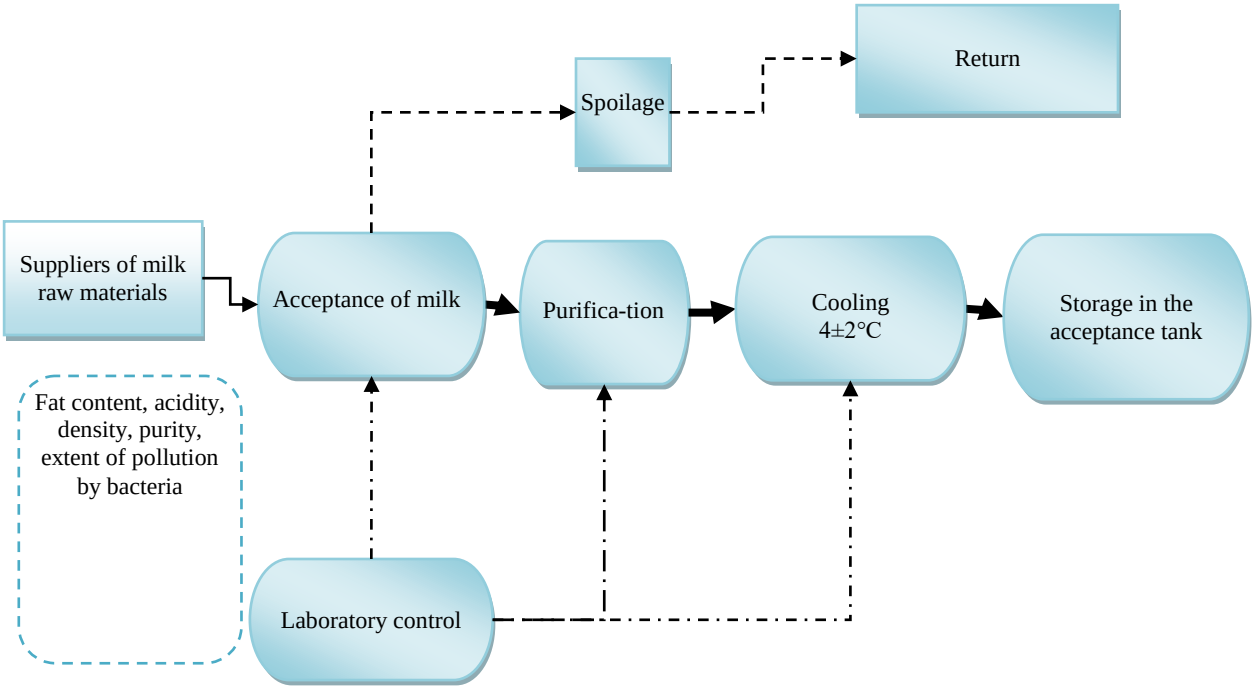


Fig. 4. Flowchart of acceptance of milk raw materials

Source: composed by the authors

The second type of control which is carried out at the milk production is operational. Control during the course of production includes quality control of semi-finished products and product at production stages and also control of observance of technological parameters and formulas for the purpose of prevention of inadvertent transfer to the subsequent stages of production of inappropriate product and prevention of deviations which can lead to production of inappropriate finished product.

Acceptance control of finished dairy products is carried out for the purpose to exclude receipt by the consumer of inappropriate production. Each consignment of raw materials arriving to the enterprise is exposed to the analysis. Organoleptic indicators and the most important physical and chemical properties of raw materials are defined constantly, according to the requirements of the working procedure (Yefimov V.V., 2009; ST RK 1732-2007).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Having analysed the provided data of information sources, it is possible to draw a conclusion that quality control of production is a component of the quality management system which, in turn, is a part of the management system of the dairy enterprise in general. Quality management, as well as management of the organization, has to be effective and productive and lead to continuous improvement of quality of production, increase in satisfaction of consumers and other interested persons of the enterprise (Salimova T.A., 2008; Rozhkov N.N., 2005; Rodionova Yu.A., 2013).

2.2 Methods of improvement of a quality management system of processes and production of the enterprise for production of dairy products

The efficiency and effectiveness of processes management can be provided with application of statistical methods which give the chance with the set degree of accuracy and reliability to judge a condition of the studied objects and processes and on the basis of it to develop optimal solutions on further actions (Rozno M.I., 2008). As a result of the carried-out analysis it is especially necessary to stop on use in a model for processes management such tools of quality as SWOT analysis allowing to reveal the strenghths and weaknesses of processes, and FMEA analysis allowing to define the potential reasons of a defect and to develop the correcting actions at implementation of processes.

SWOT analysis is the tool for the preliminary quality estimation of the process. The data obtained on its basis can be used for obtaining the structured information on each of the directions - forces, weaknesses, opportunities, threats which are important for the enterprise. In the SWOT analysis matrix these characteristics are specified (Kuzmin A.M., 2006). In SWOT analysis not only threats and opportunities are opened, but also assessment of that how important for the enterprise account in the strategy of each of the revealed threats and opportunities is is carried out.

The FMEA analysis is one of standard technologies of the analysis of products and processes quality. The methodology of FMEA allows to exclude mistakes at early stage of creation of production and processes, to establish potential discrepancies, their reasons and consequences, to carry out specification and accounting of the executed functions, to estimate risk and to take measures for elimination or decrease in dangers (Godlevsky V.E., Dmitriyev A.Ya., Izyumenko G.N., Litvinov A.V., Yunak G.L., 2002; Analysis of types and consequences of refusals. FMEA, 2003. Under edition. M: Priority).

Thus, the analysis of information sources has revealed the main directions of the researches allowing to solve the problems set in the work directed to development of the procedure of a formation of the dairy enterprise processes including subprocesses of identification, description, management and improvement of the making elements and also monitoring and controlling.

4. Results and discussions

3.1 The analysis of structural components of quality management of the dairy enterprise (on the example of "Fudmaster Company" JSC)

According to methodology of Total Quality Management activity of "Fudmaster Company" JSC in the field of quality is based on four main components: planning, management, providing and improvement of quality (fig. 5).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

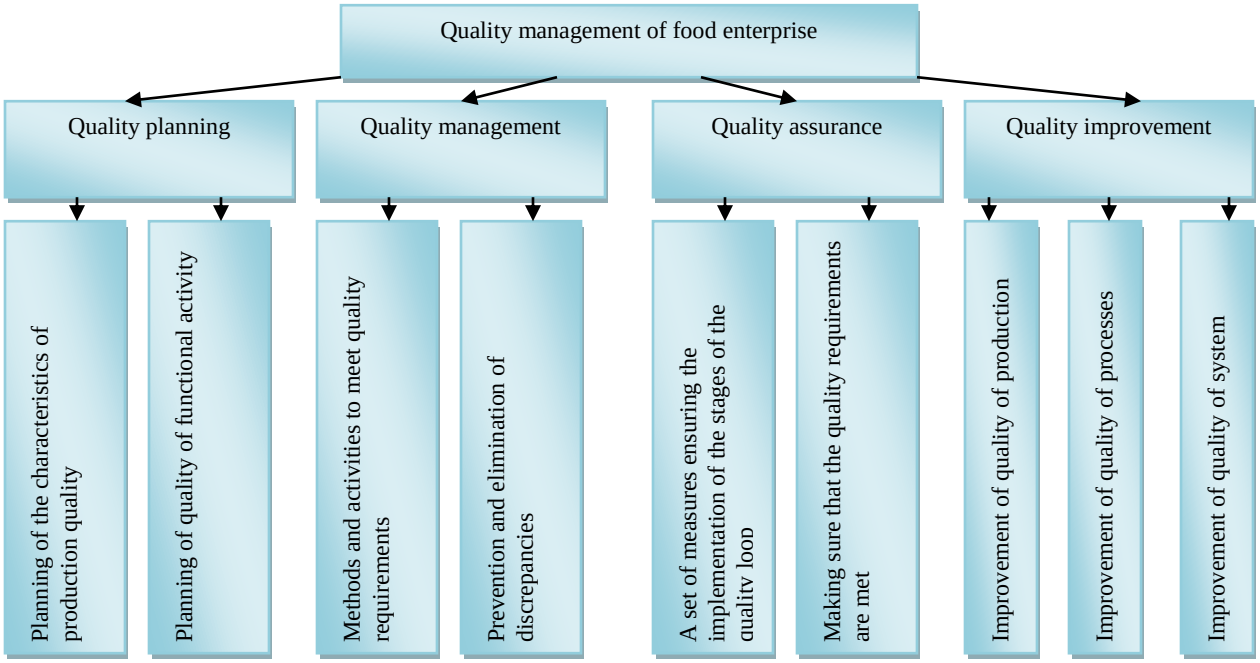


Fig. 5. The Structural Components of Quality Management

Source: composed by the authors

The analysis which is carried out at "Fudmaster Company" JSC has shown that all components of quality management are presented and their normal functioning is provided (Akhmetova S.O., Aliyeva G.B., 2013).

At "Fudmaster Company" JSC quality management is exercised constantly and includes a number of elements which normal functioning allows to achieve the set goals. Special attention is paid to management of inappropriate production. For ensuring quality the set of the actions providing performance of all stages of life cycle of production is defined (Jacobus Johannes Oschman, 2017). The analysis of activity of "Fudmaster Company" JSC also has allowed to define the strategic directions of innovative development and to create the structurally functional scheme presented in fig. 6.

Four major directions of strategic innovations of the dairy enterprise at the present stage are formulated (Vasilyeva L.N., Muravyeva E.A., 2005; Jacobus Johannes Oschman, 2017):
- improvement of quality and competitiveness of dairy products;
- introduction of innovative technologies and high-performance equipment;
- improvement of the process focused approach to activity of the dairy enterprise;
- introduction of the mechanism of processes validation and verification.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

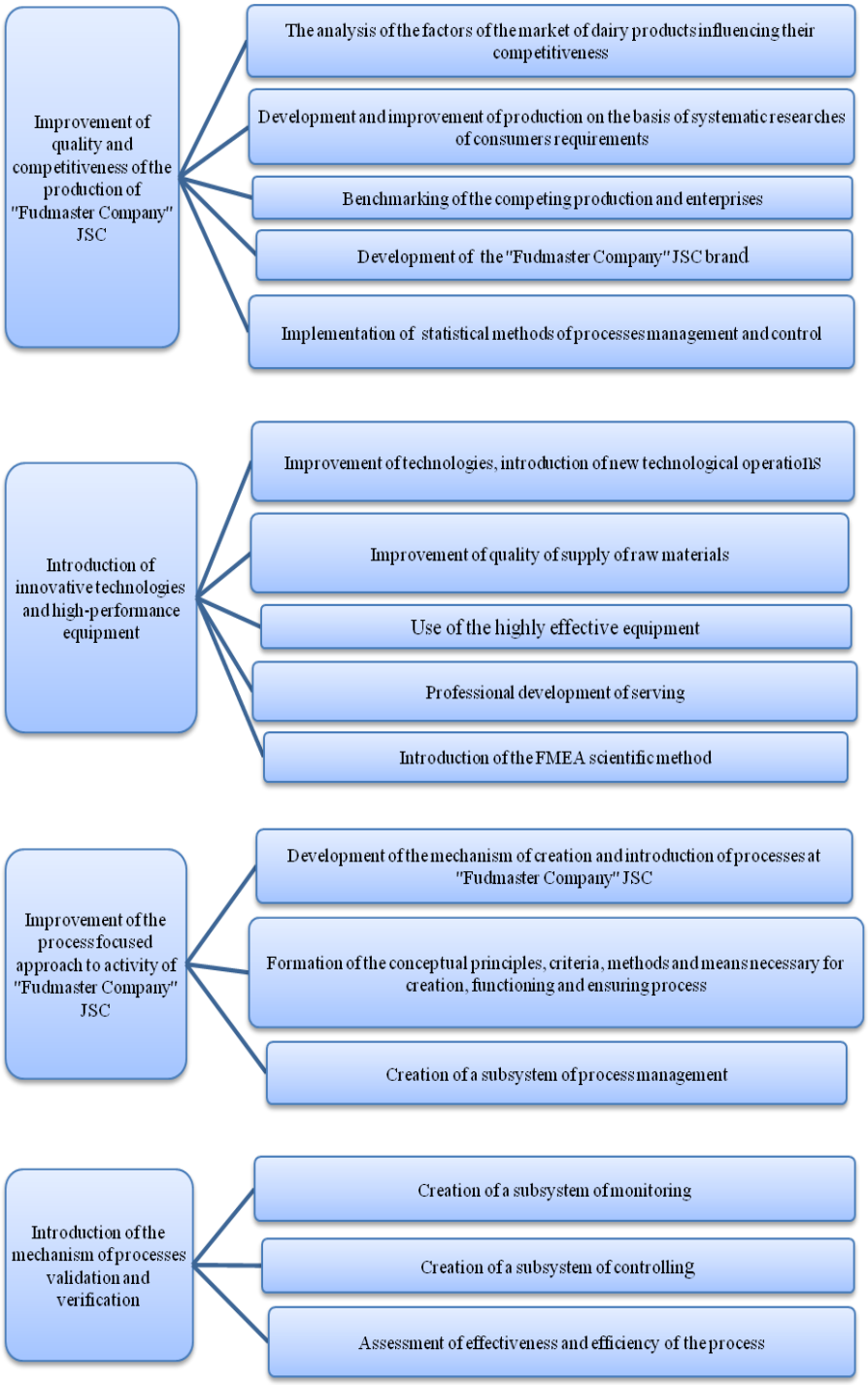


Fig. 6. Structural-functional scheme of innovative and strategic development of "Fudmaster Company" JSC

Source: composed by the authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

For increase in efficiency of activity of "Fudmaster Company" JSC improvement of process approach to quality management on the basis of system management of the interconnected processes is carried out. Thereof there was a need of creation of methodology of the dairy enterprise processes formation for the purpose of increase in their effectiveness and efficiency. (Maximova N.V., 2009; Akhmetova S.O., Kulazhanova A.M., 2013). The conducted research has allowed to reveal the strategic directions of the dairy enterprise development at the present stage. SWOT analysis and Isikava's chart have been applied to a further specification and improvement of strategy of the enterprise.

3.2 Study of opportunities of the "Fudmaster Company" JSC activity improvement when using the analysis and ensuring quality tools

For identification of opportunities of production and processes quality improvement of the enterprise for production of dairy products quality management tools have been used (Gerasimov B.N., 2005). For the purpose of identification of the cauces causing instability of activity of "Fudmaster Company" JSC the chart "cause-effect" of Isikava has been constructed. The chart has allowed to divide the problem required the solution, on separate fragments, to reveal and group the conditions and factors influencing a problem and to carry out the cause and effect analysis. A specific place on Isikava's chart is held by the elements "Monitoring, Measurements and Controlling".

The developed cause and effect chart has given the chance to reveal the major factors influencing quality of dairy products that has allowed to make a complete picture of activity of the enterprise when carrying out SWOT analysis, its weaknesses and strengths, opportunities and dangers which can develop into uncontrollable risks.

The SWOT analysis which is the most convenient scientific instrument of strategic planning (Gerasimova G.E., 2002) is applied to more in-depth study of the strategic directions of development of the dairy enterprise and also assessment strengths and weaknesses. The key directions of strategic management of "Fudmaster Company" JSC revealed as a result of the analysis are confirmed with researches with use of SWOT analysis which has allowed to identify strengths and weaknesses, opportunities of the enterprise, potential threats.

Assessment of the indicators referred to strengths was carried out on a serial scale of 0-0,5 points. It was accepted that the indicator which has got less than 0,1 points doesn't enter an initial matrix of SWOT analysis.

At discussion of the weaknesses characterizing activity of the enterprise, the commission has selected for assessment the following indicators:
- high concentration of the enterprises for production of dairy products in Almaty and Almaty region;
- relative difficulty of set of shots of an average control link;
- special requirements to storage conditions of dairy products;
- high costs for high-quality raw materials;
- strong dependence on a wholesale link.

By the results of the assessment the last indicator has got less than 0,1 points and has been excluded from the SWOT matrix.

In the analysis of opportunities of the enterprise below-mentioned indicators have been revealed:
- expansion of the range of the lower price segment on the basis of the developed strategy;
- expansion of regional sales markets;
- increase in efficiency of activity of the enterprise at introduction of process approach;
- decrease in prime cost by reduction of production costs.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

At assessment of the presented indicators all of them have received points higher than 0,1 and have entered the SWOT matrix.

Discussion and selection of the indicators on the choice and assessment of indicators characterizing threats for the enterprise for creation of SWOT matrix was a final stage of the research. To them have been referred:
- strengthening of promotion to Kazakhstan market of cheap Russian and Kyrgyz production;
- increase in prices for raw materials;
- decrease in level of income of a part of potential consumers and their transition to purchase of cheaper production.

At assessment of the indicators characterizing dangers, the commission of experts has come to a conclusion that the last indicator on points hasn't entered a total SWOT matrix.

By results of the conducted researches the matrix of SWOT analysis of the dairy enterprise given in the table 1 below has been constructed.

Table 1. SWOT-analysis matrix of "Fudmaster Company" JSC

1 STRENGTHS:	2 WEAKNESSES:
1.1 High quality of product and production (0,4 points); 1.2 Popularity of a brand of "Fudmaster Company" JSC (0,3 points); 1.3 Management efficiency on the basis of the certified QMS (0,2 points); 1.4 Existence of a modern logistics system (0,1 points).	2.1 High concentration of the enterprises for production of dairy products in Almaty and Almaty region (0,2 points); 2.2 Relative difficulty of set of shots of an average control link (0,1 points); 2.3 Special requirements to storage conditions of dairy products (0,1 points); 2.4 High costs for high-quality raw materials (0,1 points).
3 OPPORTUNITIES:	4 THREATS:
3.1 Expansion of the range of the lower price segment on the basis of the developed strategy (0,3 points); 3.2 Expansion of regional sales markets (0,4 points); 3.3 Increase in efficiency of activity of the enterprise at introduction of process approach (0,3 points); 3.4 Decrease in prime cost by reduction of production costs (0,1 points).	4.1 Strengthening of promotion to Kazakhstan market of cheap Russian and Kyrgyz production (0,2 points); 4.2 Decrease in demand for high-quality production (0,3 points); 4.3 Increase in prices for raw materials (0,1 points).

Source: composed by the authors

At the following stage the comparative analysis of indicators of SWOT matrix has been carried out. Comparison of strengths-opportunities, strengths-threats, weaknesses-opportunities and weaknesses- threats is carried out. The strategic directions of development of the enterprise and, first of all, providing high quality production due to introduction of methodology of creation of processes of the dairy enterprise and decrease in costs for production and reduction of prime cost and selling price were the result of the researches conducted at this stage (Ivanov V. A., Shilov V.M., Oborin A.V., 2004).

3.3 Study of opportunities of the process approach application at "Fudmaster Company" JSC

As have shown the results of researches of "Fudmaster Company" JSC activity, one of the most important strategic directions of the enterprise development is transition from the function scheme of management to functional and process and, according to an objective, development of a technique of formation of processes of the dairy enterprise.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Correction of the strategic directions of development of "Fudmaster Company" JSC and development of an adequate technique of process approach at the enterprise was result of the carried-out analysis. For improvement of controllability of the enterprise all parties of its activity are analysed and modeling of structure and nature of interaction between the processes is carried out (Jacobus Johannes Oschman, 2017; Bojkovska K., Tomovska J., Mohammad Ali Shariati, 2014; George Alukal, Anthony Manos, 2006).

On the basis of the analysis of network of processes of the dairy enterprise and the developed conceptual principles the functional model of process of production (fig. 7) is created. The functional model of process, unlike mathematical, logical, structural, contains all basic elements and reflects their interrelation and interaction, at the same time factors of management and resource expenses are especially noted. (Maximova N.V., 2009; Antony, J. and Preece, D., 2002; Kondo Iosio, 2002).

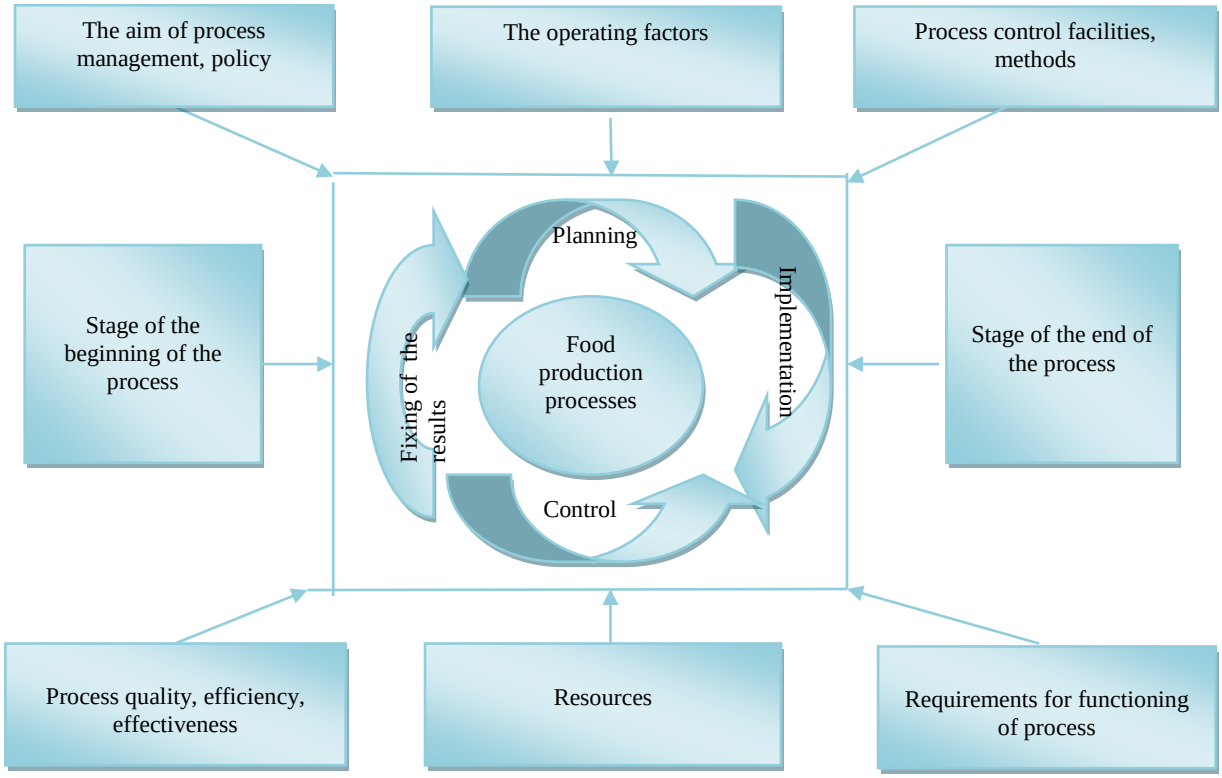


Fig. 7. Functional model of process

Source: composed by the authors

The cycle P-D-C-A offered by E. Deming is the cornerstone of functioning of each process. In the developed functional model of process of the dairy enterprise, besides traditional managing directors of factors and security with resources, the elements providing its functioning are considered.

3.4 Improvement of processes quality at "Fudmaster Company" JSC when application of methodology of FMEA analysis on the example of a production "Kefir from Fudmaster"

For the purpose of realization *at "Fudmaster Company" JSC* of the process focused approach production of "Kefir from Fudmaster" (fig. 8) has been chosen. This type of production is made at the plant in bigger volume

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

and is the main one. For the process of production of the specified product the research of a possibility of potential appearance of defects has been conducted.

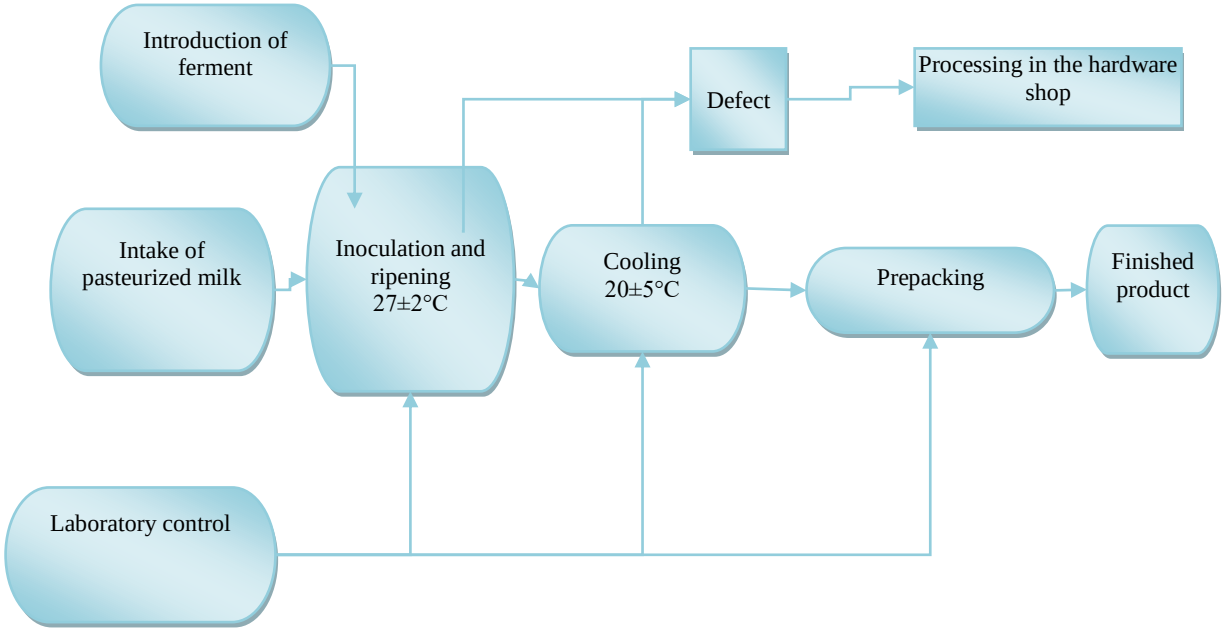


Fig. 8. Flowchart of production "Kefir from Fudmaster"

Source: composed by the authors

For decrease in probability of appearance of defects by production of "Kefir from Fudmaster" the FMEA methods in relation to technology of preparation of production have been considered. During the work analysis of the offered designs and technologies from different positions has been carried out and actions for process improvement are developed. Work was carried out in common with specialists of the following services of "Fudmaster Company" JSC: department of production planning, service of quality, laboratory, department of the chief technologist and department of the chief mechanical engineer.

The conducted researches have allowed to reveal potential defects and failures of the equipment and also failures in technological process, their cauces and consequences. Quantitative assessment with use of a serial ten-mark scale is carried out, defects were estimated by three criteria: probability of occurence of a defect (Po), gravity of a potential risk (S), possibility of identification of a defect (Pd). At high mark assessment of probability of occurence of the defect technological process was improved that as a result has yielded positive results on effectiveness and efficiency of the process (Rozno M.I., 2008; Godlevsky V.E., Dmitriyev A.Ya., Izyumenko G.N., Litvinov A.V., Yunak G.L., 2002).

The FMEA analysis of the process was carried out at a stage of technical training of production and mounting of the production equipment. By results of the research the assessment by criteria of FMEA provided in fig. 9 are obtained.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

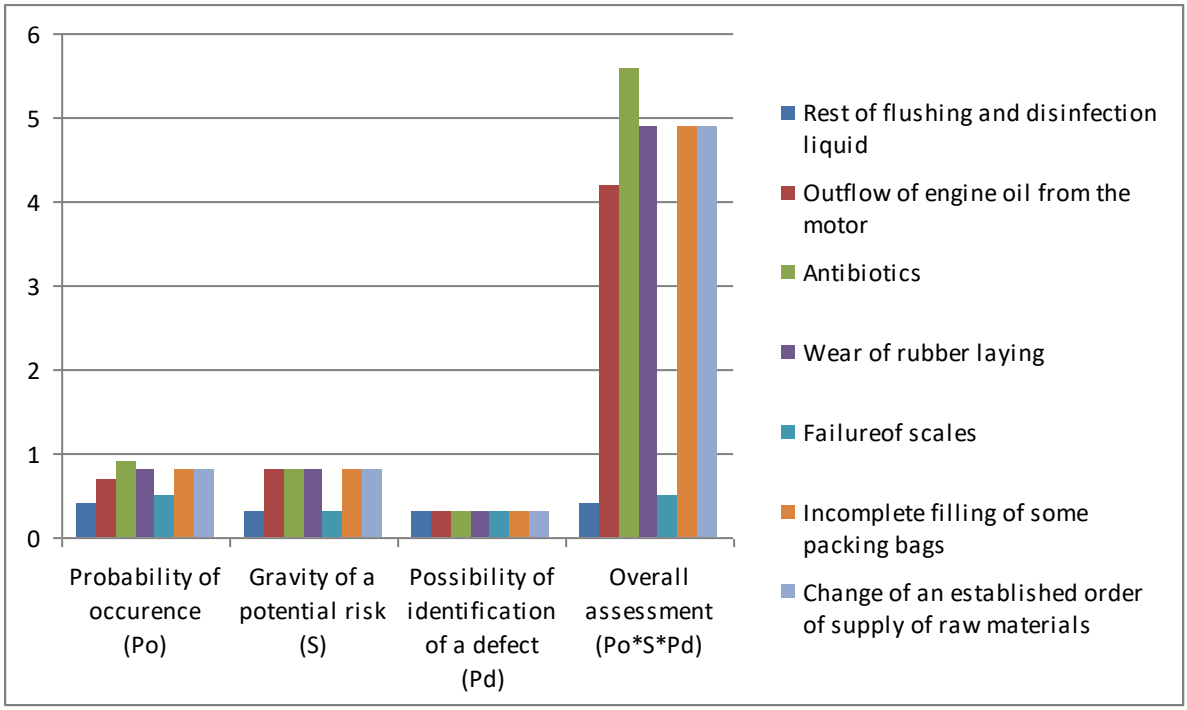


Fig. 9. Assessment by criteria of FMEA before process completion

Source: composed by the authors

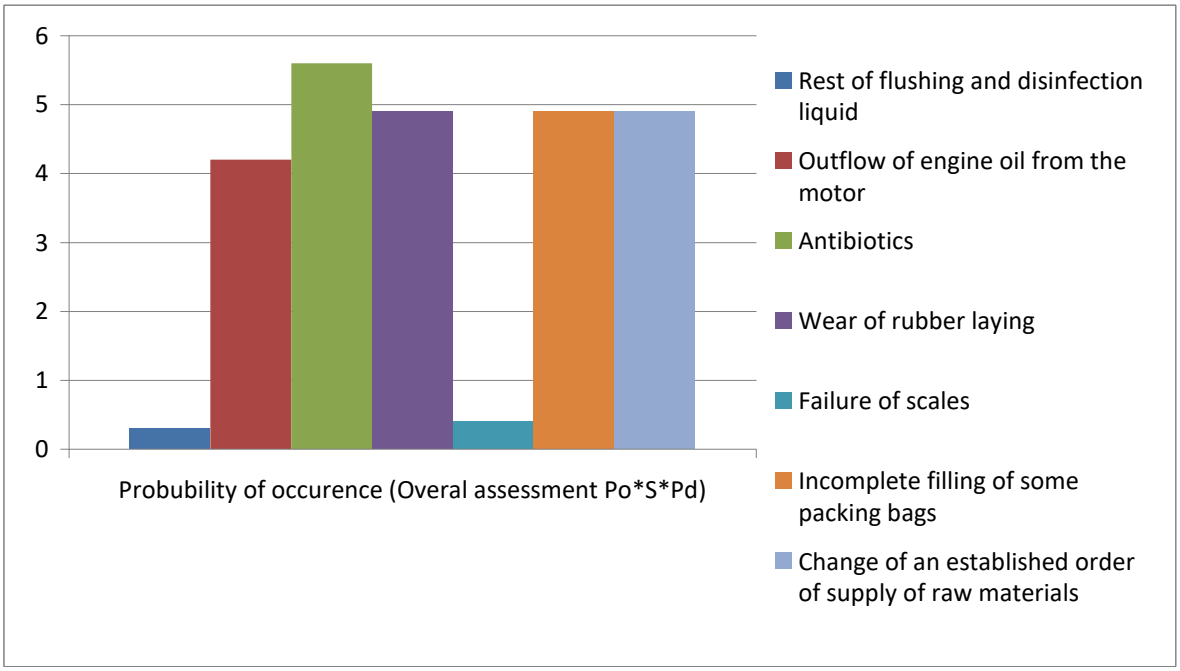


Fig.10. The overall assessment of probability of occurence of defect before "Kefir from Fudmaster" production process completion

Source: composed by the authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

In the figure 10 the overall assessment of probability of defect before "Kefir from Fudmaster" production process completion is presented.

After modification of the equipment and technology risks of occurence of defects, stated above have considerably decreased. In the figure 11 results of assessment on criteria of FMEA after "Kefir from Fudmaster" production process completion are presented.

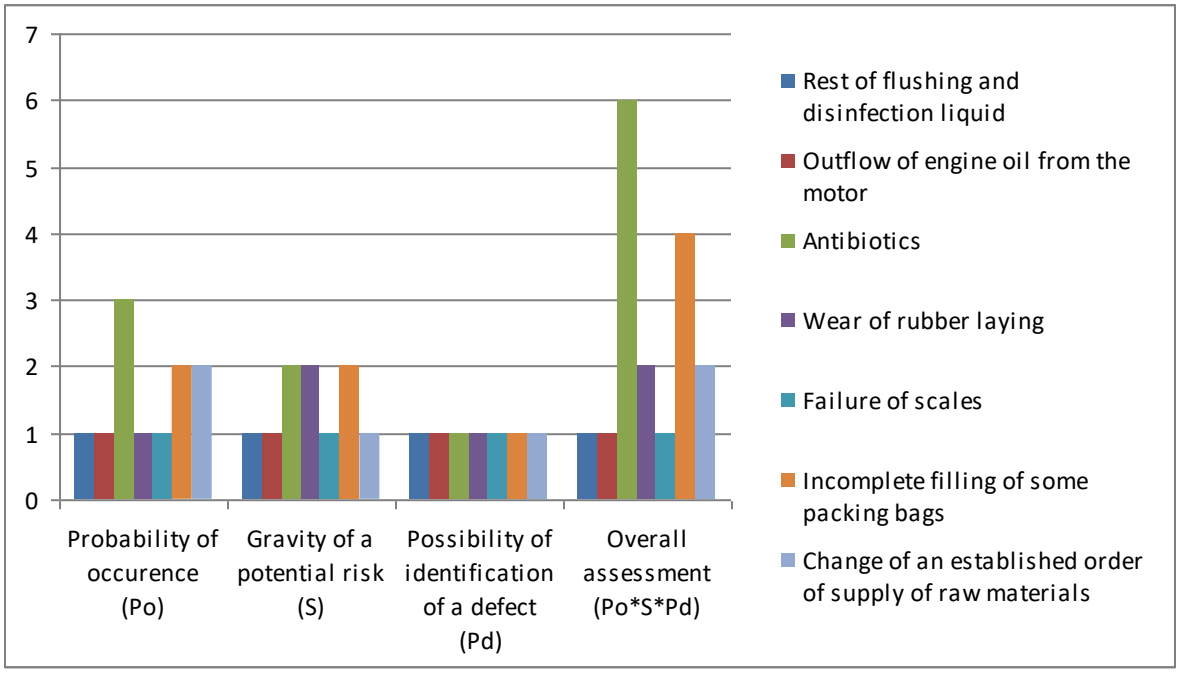


Fig. 11. Assessment by criteria of FMEA after "Kefir from Fudmaster" production process completion

Source: composed by the authors

In the figure 12 results of overall assessment of probability of occurence of defects after "Kefir from Fudmaster" production process completion are presented.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

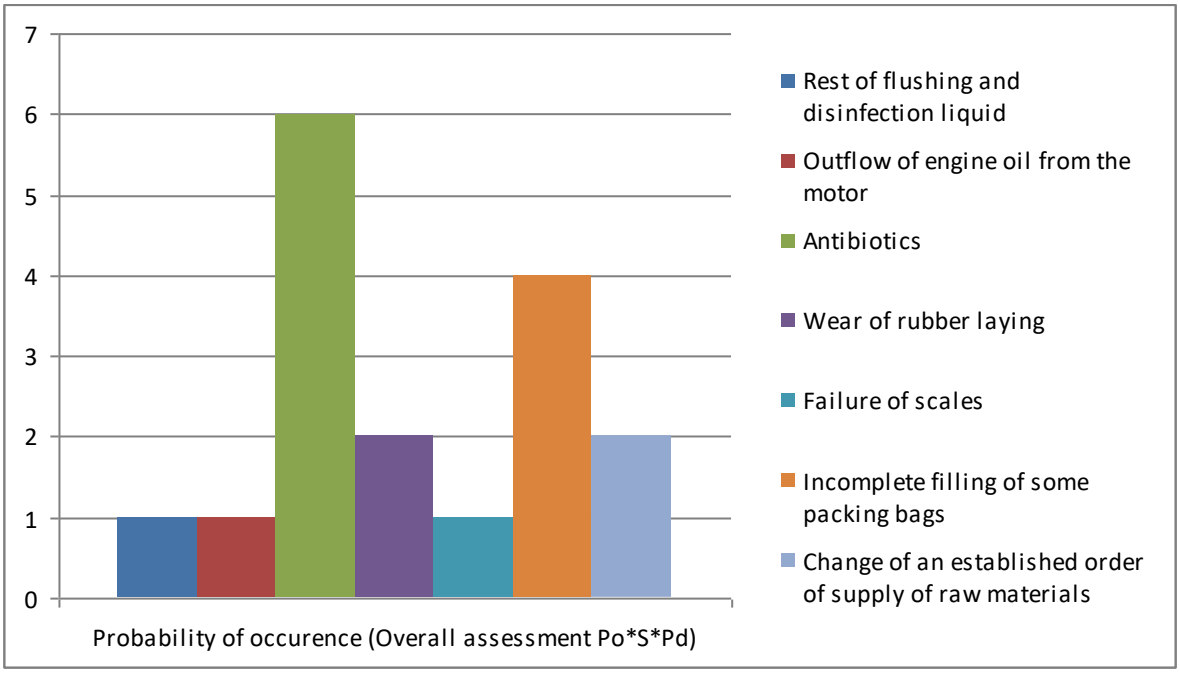


Fig. 12. The overall assessment of probability of occurence of a defect after "Kefir from Fudmaster" process production completion

Source: composed by the authors

In the figure 13 comparison of the overall assessment of FMEA before and after "Kefir from Fudmaster" production process completion is presented.

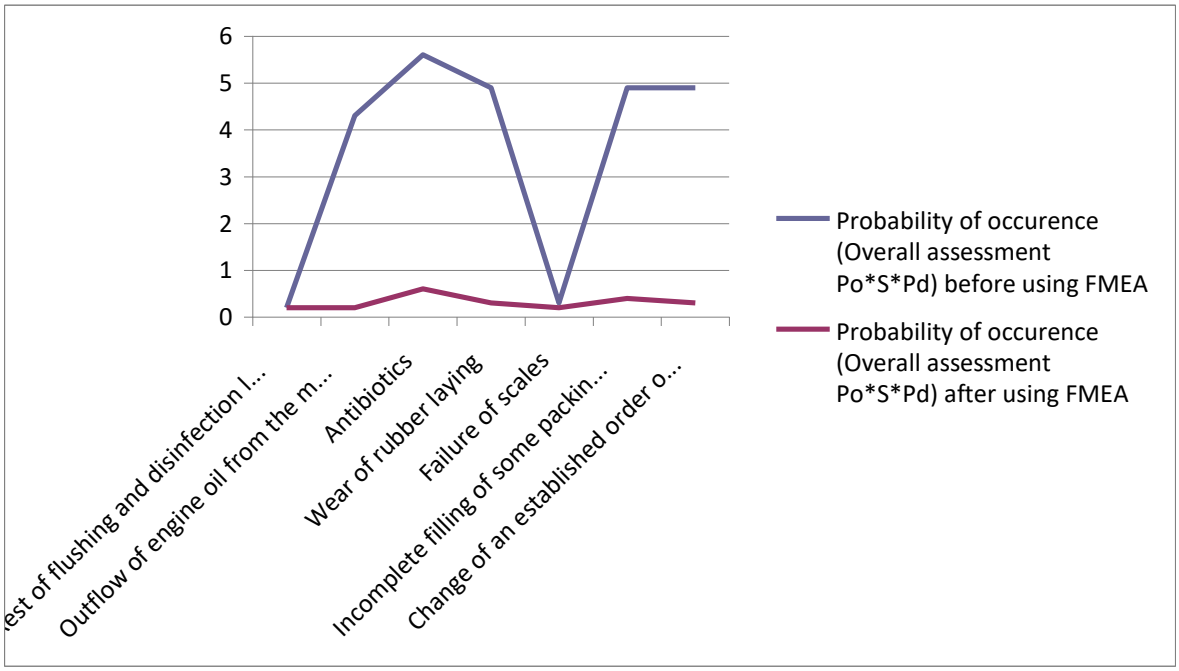


Fig. 13. Comparison of FMEA overall assessment before and after production process completion
Source: composed by the authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Apparently from drawings, there is a positive effect from application of FMEA methods, the possibility of defects is most reduced. In most cases assessment of criteria of FMEA, such as probability of occurrence of an event (Po), gravity (S) and a possibility of identification (Pd) are brought to a rational ratio, respectively — "occurence of defect is improbable", "there is no potential risk for a product" and "the defect will be revealed in 100% of cases".

Application of FMEA technique has provided constant quality of product in combination with high flexibility of production. The modifed way of production has considerable advantages that pass enough exact masses having the constant temperature and identical tastes turns out. During completion the causes of defects have been excluded. By means of change of a design and technology the possibility of defect and its influence on production have been reduced. Also the reliability of identification of defect has been facilitated and increased.

As a result of the executed complex researches at “Fudmaster Company” JSC the Standard of the organization on formation of processes of the dairy enterprise is created and evidence-based (Ponomarev S.V., Mironov S.V., 2007; Kondrikov V. A., Plotnikov N.V., 2006; Akhmetova S.O., Aliyeva G.B., 2013). The structure of the standard of the organization conforms to the requirements for the documentation established at “Fudmaster Company” JSC. The standard consists of a complex of the mechanisms providing normal functioning of the process. It is the structural-functional scheme and the operational card of the process allowing to open interaction of the inputs and outputs of subprocesses, the operating factors and resource providing. Besides, it is shown how it is possible to identify control points of the process which are determinants of its stability. In control points the owner of the process can determine by rejections of characteristics in the on-line mode a condition of the process and the existing trends. Thanks to it the regular traceability of the process and a possibility of timely intervention for the purpose of reduction into statistically operated state is provided.

The responsibility matrix - a necessary element of each process allows to see and to check visually duties of the personnel providing process functioning. Ensuring the basic principle of quality management system - process improvement - is a fundamental task of the process owner. The algorithm including a number of stages on process improvement is developed for these purposes. In general the standard provides creation and normal functioning of processes at dairy plant (Shichkov N.A., 2005; Evans James R., 2007; Bojkovska K., Tomovska J., Mohammad Ali Shariati, 2014; Advice from ISO/TC 176, 2018).

Conclusions

- On the basis of the studying of information sources and researches conducted by means of SWOT analysis and the cause and effect chart of Isikava the strategic directions of development of the enterprise for production of dairy products including need of structuring and improvement of the process focused approach for quality management are evidence-based;
- As a result of the conducted researches and the scientific analysis the conceptual principles allowing to create, identify and carry out effective functioning of the process of the dairy enterprise are defined;
- The model of the dairy enterprise processes network which is structurally uniting four key groups of the main processes is created;
- The functional model of the dairy enterprise process in which the interrelation between the input and output of the process which is carried out according to the principles of the PDCA is evidence-based is developed. The process is provided with resources and subsystem of management based on statistical methods and means, and functioning under certain conditions set by requirements of production for the purpose of obtaining planned values on effectiveness and efficiency of the indicators;
- On the basis of the offered scientific and methodical approach "Kefir from Fudmaster" production process is structured;

- The possibility of use of FMEA analysis scientific methodology in technology of preparation of production "Kefir from Fudmaster" is shown that has allowed to exclude the caces and to reduce probability of occurence of defects in production;
- By the results of the conducted complex research the standard of the organization for formation of processes of the enterprise for production of dairy products is created and evidence-based. The procedure of processes creation allowing to perform coding and name, definition of goals and formation of the structure, including the owner's appointment, identification of input, output and resources, construction of responsibility matrix, evaluation of efficiency and effectiveness is developed.

References

Akhmetova S.O., Aliyeva G.B. (2013). Improvement of quality management system of the Fudmaster LLP company. Proceedings of Intern. Scient. and Pract. Conf. "Processing and Quality Management of Agricultural Production": - Minsk, BGATU, p. 212-216.

Akhmetova S.O., Kulazhanova A.M. (2013). The mechanism of improvement of the management system of business processes at the Becker and K LLP enterprise, *Journal of ATU*, Almaty, No. 1, p. 33-41. elibrary.ru/contents.asp?issueid=1358039

Akhmetova, S.O., Fuschi, D. L., Vasiliūnaitė, R. (2017). Towards food safety: quality management peculiarities, *Journal of Security and Sustainability Issues* 6(3): 513–522. http://dx.doi.org/10.9770/jssi.2017.6.3(15)

Aksenov N.M. (2005). Positive moments of process approach, *Director*, No. 1, p. 13-17. vestnik.osu.ru/2011_13/39.pdf

Analysis of types and consequences of refusals. FMEA (2003). Under edition. M: Priority. 74 p.

Antony, J. and Preece, D. (2002). *Understanding, Managing and Implementing Quality*, Routledge, London. https://www.taylorfrancis.com/books/9780203464083

Avstriyevsky A.N., Kantare V.M., Surkov I.V. (2007). Quality management at the enterprises for food and processing industry. Novosibirsk: Sib. Univ. publ. house. 268 pages. https://www.twirpx.com/file/1710186/

Barth T.V. (2007). Quality management. M.: MIENP. 235 p. https://www.twirpx.com/file/422382/

Belobragin V.Ya. (2003). Quality: lessons of the past and present. M.: ASMS. - 273 p.

Bettina, Warzecha, (2017). Problem with Quality Management Process orientation, controllability and zero-defect processes as modern myths. Walsrode. ISBN 9783981863833. OCLC 992993108. https://www.amazon.com/.

Bojkovska K., Tomovska J., Mohammad Ali Shariati (2014). Conteporary Quality Management System Elements in the Food Industry, *VestnikOrelGAU*, 6(51), p. 48-50.

Costa A.I.A., Dekker M., Jongen W.M.F. (2001). Quality function deployment in the food industry: a review, *Trends in Food Science and Technology*, 11, 306-314 pp. http://icm.clsbe.lisboa.ucp.pt/docentes/url/anacosta/artigo/Costaetal_TFST2001_QFDReview.pdf

Evans James R. (2007). Quality management: manual, M.: UNITY-DANA. 671 p. https://www.twirpx.com/file/969796/

George Alukal, Anthony Manos (2006). *Lean Kaizen. A Simplified Approach to Process Improvements*. 192 p. https://www.amazon.com/

Gerasimov B.N. (2005). Instruments of quality management. Manual. M.: STU. 32 p.
https://www.twirpx.com/file/532211/

Gerasimova G.E. (2002). Statistical management of technological process. M.: NTK Track. 232 p.

Godlevsky V.E., Dmitriyev A.Ya., Izyumenko G.N., Litvinov A.V., Yunak G.L. (2002). Application of a method of the analysis of types, cauces and consequences of potential discrepancies (FMEA) at various stages of life cycle of production /Under V.Ya. Kokotov's edition. Samara: GP Prospect. 160 p. magisterjournal.ru/docs/VM56_4.pdf

Goryacheva E.D., Maximova N.V. (2008). Management of food creation process on the basis of the theory of structuring functions of quality // the Collection of the reports of the VI scientific and technical conference with the international participation "Highly effective food technologies, methods and means of their realization: effective use of resources of branch" (Moscow) – M.: MGUPP. – p. 265-266. http://tekhnosfera.com/

H. L. M. Lelieveld, John Holah, David Napper (2014). *Hygiene in Food Processing: Principles and Practice*, Edition 2. Elsevier, 640 p. https://www.elsevier.com/

H. L. M. Lelieveld, John Holah, Domagoj Gabric (2016).*Handbook of Hygiene Control in the Food Industry*, Edition 2. Woodhead Publishing. 756 p. https://www.elsevier.com/

Hoyle, David (2007). *Quality Management Essentials*, Oxford, United Kingdom: Butterworth-Heinemann, p. 200, ISBN 9780750667869, OCLC 72868446, retrieved 2013-10-19. https://trove.nla.gov.au/version/31318851

http://www.foodmaster.kz/

Isaev S.V. (2006). Introduction of techniques of statistical processes management and analysis of measuring systems, *Methods of quality management* No. 9, p. 39-41. http://www.icgrp.ru/docs/list/article/?action=showproduct&id=8

ISO 9001:2015 for Small Enterprises: What to do. Advice from ISO/TC 176. (2018). 188 p. Item Number: T1148E https://www.iso.org/iso/

Ivanov V. A., Shilov V.M., Oborin A.V. (2004). Continuous improvement and its place in QMS of the organization, *Quality Management Methods* No. 4, p. 41-45. www.dissercat.com

Jacobus Johannes Oschman (2017). The Role of Strategic Planning in Implementing a Total Quality Management Framework: An Empirical View, *Quality Management Journal* - Volume 24 • Number 2, Issue 4. https://www.tandfonline.com/.../10686967.2017.11918508

Kondo Iosio (2002). Quality management in scales of the company: formation and stages of development: translation from English. Nizhny Novgorod: SMTs "priority". 252 p. deming.ru/Books/UpravKach.htm

Kondrikov V.A., Plotnikov N.V. (2006). Effectiveness and efficiency of QMS of the enterprise, *Quality Management Methods* No. 10, p. 27-31. https://cyberleninka.ru/

Kuzmin A.M. (2006). Seven instruments of quality management, *Quality Management Methods* No. 5, p. 21-22. https://www.twirpx.com/files/business/periodic/mmk/metody_menedzhmenta_kachestva_200/

Lafta J.K. (2007). Efficiency of management of the organization. Manual. M.: Russian business literature. 237 p. https://www.twirpx.com/file/549019/

Matison V. A., Tikhomirov I.A. (2007). Monitoring of overall effectiveness of the equipment, *Food Industry* No. 2, p. 40-42. https://lib.esstu.ru/cgi-bin/irbis64r_12/

Maximova N.V. (2009). Improvement of food enterprise's quality management systems on the basis of analysis and improvement, *Food Industry* No. 4, p. 56-61. www.dissercat.com

Ponomarev S.V., Mironov S.V. (2007). Formation and assessment of indicators of effectiveness and efficiency of QMS processes, *Standards and Quality* No. 8, p. 70-72.

Tvaronavičienė, M., Tarkhanova, E., & Durglishvili, N. (2018). Sustainable economic growth and innovative development of educational systems. *Journal of International Studies* Vol. 11 No. 1, p. 236-244. https://doi.org/10.14254/2071-8330.2018/11-1/19

Quality manual. "Fudmaster Company" JSC. (2016), p. 7-16. http://www.foodmaster.kz/release/

Repin V.V., Eliferov V.G. (2006). Process approach to management. Modeling of business processes. M.: RIA "Standards and quality". 404 p. https://www.twirpx.com/file/100807/

Rodionova Yu.A. (2013). Organization of assessment and monitoring of a quality management system of the enterprise. Abstract of the dissertation, St. Petersburg. 18 p.

Rozhkov N.N. (2005). Statistical methods of quality control: manual. St. Petersburg: IPTsSPGUTD. 145 p. https://www.kpfu.ru/

Rozno M.I. (2008). Once again about statistical control and quality control of production in general, *Quality Management Methods* No. 7, p. 50-53. ria-stk.ru/mmq/adetail.php?ID=9055

Salimova T.A. (2008). Quality management: the textbook - the 2nd ed. Ster. M.: Omega-L. 414 p. https://www.twirpx.com/file/869689/

SanPiN No. 611 8/6/2010 Health Regulations and Norms "Hygienic requirements for food products". https://online.zakon.kz/Document/?doc_id=1043552

Schuster M.M. (2006). Process approach as craft, *Quality Management Methods* No. 7, with. 15-19. quality.eup.ru/DOCUM4/remeslo.htm

Shadrin A.D. (2006). Quality management from bases to practice. M.: NTK Track. 360 p. trim.ru/sites/default/files/files/pdf/quality_management_project.pdf

Sharipov S.V. (2004). Quality management system: developed and deploym. on the basis of International ISO 9001:2000 standard / S.V. Sharipov, Yu.V. Tolstova. — SPb.: Peter; Peter Print. – 189 p. https://updoc.site/download/librarypsukz_pdf

Shichkov N.A. (2005). How to measure characteristics of processes of QMS //Quality Management Methods. No. 2, p. 14-17.

ST RK 1732-2007 – Milk and Dairy Products. Organoleptic method of determination of indicators of quality. https://online.zakon.kz/document/?doc_id=31070321

ST RK 1733-2015 Milk and Dairy Products. General specifications. https://online.zakon.kz/document/?doc_id=32459980

ST RK 1734-2007 Milk and Dairy Products. Acceptance procedures and test methods.https://online.zakon.kz/document/?doc_id=31683701

ST RK ISO 10001-2009 Quality management. Satisfaction of the consumer. https://online.zakon.kz/Document/?doc_id=31426233

ST RK ISO 19011-2013 (IDT, ISO 19011:2011) Guidelines for auditing management systems.
https://www.belstu.by/Portals/0/userfiles/125/GOST-ISO-19011-2013.docx

ST RK ISO 9000:2016: Quality management systems - Fundamentals and vocabulary. https://www.iso.org/standard/45481.html

ST RK ISO 9004-2010 (IDT, ISO 9004-2009) Managing for the sustained success of an organization. A quality management approach. https://online.zakon.kz/document/?doc_id=31306691#pos=0;0

ST RK ИСО 9001-2016 Quality management systems - Requirements. https://www.iso.org/standard/45481.html

Technical Regulations of the Customs Union 021/2011 About safety of food products.
webportalsrv.gost.ru/portal/GostNews.nsf/.../$FILE/TR_TS_021-2011_text.pdf

Tereshchenko N.V., Yashin H.C. (2006). Model of complex assessment of effectiveness of QMS, *Quality Management Methods* No. 4, p. 12-17. quality.eup.ru/DOCUM4/remeslo.htm

Vasilyeva L.N., Muravyeva E.A. (2005). Methods of management of innovative activity. M.:KNShchRUS. 130 pp. http://estud.ru/litra157/

Yefimov V.V. (2009). Means and methods of quality management: manual. M.: KNORUS. 232 p. http://www.docplayer.ru/56430230

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(18)

Acknowledgements

This research was supported by the project, which has received funding from the Ministry of Education and Science of the Republic of Kazakhstan, the Grant of a Scientific Project on the theme "Monitoring and optimization of food safety based on innovative nanotechnologies" (2015-2017, state registration number is 0115RK01777)†

Short biographical note about the contributors:

Saule Ospandiyarovna, Akhmetova is the Associate Professor in Chemical Engineering of Almaty Technological University, Almaty, Kazakhstan. PhD in Technology of Inorganic Substances. Chartered Engineer-Chemist-Technologist (CEng), Researcher and Academic Staff of Higher Education Institutions with almost 35 year experience, a track record of over 90 publications, including monograph "Processing of low-grade phosphorites", 8 USSR and RK patents, scientific papers and presentations on the conferences, acquisition of 5 projects. A Scholar of the International "Bolashak" Programme of the President of the Republic of Kazakhstan 2013-2014. Research areas: Complex processing of low-quality phosphatic raw materials into important products of economic value; Analysis and improvement of QMS of the enterprises for food industry of RK, Food Security, Ecology.

ORCID ID: orcid.org/0000-0001-7287-766X

Mariya Shayakhmetovna, Suleimenova is the Associate Professor in Chemistry and Head of the department "Chemistry, Chemical Engineering and Ecology" of Almaty Technological University, Almaty, Kazakhstan. PhD in Chemical Kinetics and Catalysis. Her scientific and pedagogical experience is more than 30 years, a track record of 200 publications, including 20 textbooks, 1 monograpf, 10 USSR and RK patents, scientific papers and presentations on the conferences. Acquisition and advisor of 10 projects: 1 international and 9 Republican scientific projects finded by RK and IScTechC (the partner program of the USA). Area of scientific interests: catalytic synthesis of dyes and biologically active agents, creation of biomaterials for branches of agro-industrial complex, food security, ecology.

ORCID ID: orcid.org/0000-0001-5455-6475

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

Publisher
http://jssidoi.org/esc/home

CONFICURATION OF ENTERPRISE NETWORKS*

Aleksandr M. Batkovskiy [1], Pavel A. Kalachikhin [2], Elena G. Semenova [3], Yury F. Telnov [4], Alena V. Fomina [1], Victor M. Balashov [5]

[1] *JSC "Central Research Institute of Economy, Management and Information Systems "Electronics", 12 Kosmonavta Volkova Str., Moscow, 127299, Russian Federation*

[2] *Institute for Scientific and Technical Information of Russian Academy of Sciences, 20/2 Usievicha Str., Moscow, 125190, Russian Federation*

[3] *Saint-Petersburg State University of Aerospace Instrumentation, 67 Bolshaya Morskaia Str., Saint-Petersburg, 190000, Russian Federation*

[4] *Plekhanov Russian University of Economics, 36 Stremyanny lane Str., Moscow, 117997, Russian Federation*

[5] *JSC «Scientific and Production Enterpise "Radar MMS"» 37A Novoselkovskaya Str., Saint-Petersburg, 197375, Russian Federation*

E-mails: batk0vskiy_a@instel.ru; pakalachikhin@viniti.ru; egsemen0va@mail.ru; YTeln0v@mail.ru; fomina-a@instel.ru; balashov-vm@radar-mms.com

Received 10 March 2018; accepted 30 June 2018; published 30 September 2018

Abstract. In the study, we consider the methods for optimizing the configuration of the network structure of enterprises based on the theory of fuzzy sets. These methods allow customizing the value chain in such a way as to maximize the likelihood of the success of a joint project to create innovative products. A strategic decision to change the configuration of the network structure is made based on an analysis of deviations of the generalized capabilities from the generalized requirements for the enterprise and its closest neighbors along the value chain. This optimization principle allows changing the configuration, taking into account the interests of participants in the network structure as a whole. We have formulated the task of developing tools for enterprise engineering based on intelligent decision support technologies and multi-agent systems. The approach to justifying decisions in the conditions of lack and incompleteness of the initial data on the basis of soft models is an alternative to existing traditional methods. The proposed network structure optimization model will allow effective strategic planning, supporting flexible management mechanisms at the strategic and operational levels. The research results show that it is possible to improve the efficiency of interaction between enterprises united by common goals by using services that allow enterprises to find information about their potential partners.

Keywords: business model; network structure; value chain; key competencies; clusters; technology transfer

* *The study was supported by the Russian Foundation for Basic Research (RFBR), project 16-07-01062*

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

Reference to this paper should be made as follows: Batkovskiy, A. M.; Kalachikhin, P.A.; Semenova, E.G.; Telnov, Y.F.; Fomina, A.V.; Balashov, V.M. 2018. Conficuration of enterprise networks**,** *Enterpreneurship and Sustainability Issues* 6(1): 311-328. http://doi.org/10.9770/jesi.2018.6.1(19)

JEL Classification: C10, C18, C51

1. Introduction

For successful implementation of system transformations, modern methods and approaches of enterprise engineering are applied, including the construction of flexible organizational structures of enterprises and management of business processes on the basis of multi-agent technologies. However, on the way to the implementation of the formulated paradigm there are a number of not completely solved problems, which include the necessity to maintain the integrity of the network structure from the position of optimizing the components of the business models of enterprises, such as resources, business processes, key competencies, etc.

In the field of enterprise architecture development, the formation of more freely communicating communities of enterprises, which cooperate to achieve changing but clearly formulated goals, is acquiring a great importance. The purpose of the present study is to develop methods and tools for intellectual decision support in the field of enterprise engineering in order to optimize the configuration of network structures. In this study, the problem is to develop the methods and tools for enterprise engineering based on intelligent decision support technologies and multi-agent systems. The formation of enterprise network structures should be based on the use of multi-agent technologies and the formalization of the roles of the main agents of the value chain for the network business model. In addition, it is necessary to develop rational criteria for decision-making by the agents of the network structure of enterprises.

The novelty of the proposed model for optimizing the network structure of enterprises is the use of multi-agent technology that allows quick adaptation to changes in the conditions and requirements of the market and the adjustment of the corresponding components of the business model towards alterable innovation strategies. The creation of network architecture allows optimizing the activity and business processes of enterprises by linking the configuration of the network structure with the functional activities and technologies used in accordance with the chosen business model. In this case, the configuration of the enterprise network structure is tied to the architecture of the information system used as a platform for the agent search.

The development of methods and tools for intellectual decision-making support for enterprise engineering and multi-agent network structures will enable implementing effective strategic planning, supporting flexible management mechanisms at the strategic and operational levels. The proposed method of enterprise engineering allows raising the level of systemic transformation of enterprises to the level of modern requirements of innovative development of the economy.

Generalizing the presented concept of engineering of enterprise network structures, which fully applies to the enterprises of the basic technological industries and ensures their effective innovative development, we can identify the most important direction for us, which is engineering of business models and optimization of interactions between enterprises.

The hypothesis of our research can be formulated as follows: agreements between enterprises will bring the greatest benefit to individual participants and give positive results if they are based on the principle that it is necessary not to take into account the interests of each participant separately, but act on the basis of the interests of the entire project.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

2. Literature review

Ensign (2001) proposed the definition of value as a unique combination of goods and services that are important to the buyer. Different types of the cost of the commodity, such as the individual and market costs, with some degree of approximation are identical with its utility, and also with the value of this product.

Ansoff (1989) believes that the competence of the enterprise, on one hand, is determined by the abilities of managers, and, on the other hand, by general experience as a whole. Competence includes a problem-solving method, a problem-solving procedure, a management process, an organizational structure, remuneration and economic incentives, job description, technical means and the organizational potential of the enterprise.

The term "core competencies" was introduced by the Indian economist C. Prahalad. Prahalad, & Hamel (1990) stated that core competencies are a collective subject of research in organizations, especially in order to coordinate a variety of production skills and combine the technologies used. Unlike physical assets that really deteriorate over time, competencies only increase, as they are used and shared. Experts recommend that the enterprise that produces innovative products should have several competencies and many times more capabilities (Song, & Lee, 2014).

While the "capability", in particular, "the capability of the enterprise", is understood as skills, faculties, knowledge, etc. necessary for a certain type of activity (in our case, for the creation of innovative products), we will treat "enterprise capabilities" more broadly as "general" *capabilities of the enterprise*. The general capabilities of the enterprise include its key competencies, as well as its innovative potential.

Similarly, treating requirements in a broader sense as "*general requirements"*, we will include there the requirements for resources, standards and risks. The requirement for risks means working according to the principle of eliminating risky options, actions, measures and alternatives in the enterprises. In this case, collective risks in the network structure as a whole are considered as a component, that is, a common component for all enterprises used in the calculation of individual risks (Batkovsky *et al*., 2015).

Boynton, & Zmud (1984) claim that planning in the enterprise is carried out at three levels: political, strategic and executive (or operational). By analogy, it is possible to distinguish the strategic and operational levels in the management of the enterprise. Decisions at the highest level imply management of the enterprise as a large economic system as a whole. Lower-level solutions are related to the management of production, technological and other business processes. In addition, Ansoff (1989) notes that the choice of a strategy at any level should always be based on the capabilities of the enterprise.

Reinforcing their own considerations, Boynton and Zmud argue that the benefits of applying critical or key success factors (CSFs) at all levels of enterprise planning are connected with effective support of the planning process, development of information service ideas, which can affect the competitiveness of the firm. The weaknesses in the CSFs are manifested in that it is more difficult for managers who are remote from management positions to identify significant CSFs. Besides, it is difficult for certain managers to specify their information needs using only CSFs (Boynton, & Zmud, 1984).

Grunert, & Ellegaard (1992) define a critical success factor as a skill or resource that the business can invest in the market and that impacts the market, while making up the bulk of the perceived differences in present value or relative costs.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

In turn, Scheer, & Nüttgens (2000) associate strategic goals with the activities to achieve goals (in the form of an ordered list) and the tree of goals (a graph composed of nodes with the key performance and effectiveness indicators). Adhering to the newest ideology of strategic management, Haughey (2013) writes that the goal should be measurable, that is, should be expressed through target values of indicators or maxima (minima) of objective functions, in some cases, very sophisticated ones. Thus, the strategic goals, expressed through KPI (key performance indicators), turn out to be related to CSFs.

The formulation of our above hypothesis in the terms considered in this review is as follows: contracts between enterprises belonging to different parties of the configuration of the network structure will bring the maximum benefit to individual participants and the entire network of enterprises if they are based on the principle, according to which it is necessary to minimize not the sum, but the product of the generalized capabilities of enterprises with respect to the general requirements to them.

3. Materials and Methods

The calculation of most of the indicators mentioned in this study was based on the method of expert assessments, because it is the most convenient tool for assessing the quality characteristics belonging to certain objects with a complex structure. To date, this method is still being developed including in the applied research in the economic sciences. General issues of expert assessments in the context of decision making, intellectual technologies and risk assessment are considered in (Orlov, 2013). The expert method of assessing the qualitative characteristics of objects, which we are most interested in, is used in various versions such as semantic differentials (Stepnova, 1992) or the Thurstone scale (Bozhuk *et al*., 2011).

Expert methods can be effectively combined with so-called “soft models” (Zadeh, 1994), especially with fuzzy sets and fuzzy logic. There is a variety of different types of fuzzy sets, which in the articles (Chen, & Xu, 2014; Torra, 2010) are successfully reduced to a universal type of hesitant fuzzy sets. The fuzzy sets, involved in this study, with a continuous membership function analytically defined on intervals, are not an exception to this generalization.

In the present study, the models of subject fields that are commonly referred to as ontologies (Mizoguchi, 2003; Gruber, 1993; Liu, & Özsu, 2009) are interpreted differently from the philosophical interpretation of this term. Since our research has a theoretical rather than an applied orientation, thus we are interested first of all in the development of ontologies, which in the future can be used in the business models engineering and the network structures of enterprises. The ontological approach to enterprise representation, described in the study (Telnov, 2014), makes the aspects of enterprise activity more “transparent”, and the profile of the enterprise itself more open.

The formal presentation of the hypothesis, formulated in two versions, requires the application of the mathematical tools mentioned in this section. But before proceeding to the description of mathematical methods, it is necessary to consider more closely the value chain, because this chain naturally limits the scope of presenting the research results.

4. Results and Discussion

4.1. Analysis of elements of the network chain of creating the innovation product value

The value added chain diagram (VAD) describes a certain landscape, for which we consider the possibility of flexible optimization of the network structure of enterprises. Osterwalder (2004) and Pigneur (Osterwalder, &

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

Pigneur, 2012) distinguish three types: (1) the "value chain" model for the value creation contains various actions that an enterprise performs to supply inexpensive or differentiated products. According to Porter, the main activity of the structure of the value chain includes input logistics of initial resources, operations, output logistics of the results of processes, marketing and sales, service; (2) the "value shop" model of the value creation is an extension of the basis of the conventional value chain, in its usual sense according to Porter (1985); (3) the "value creation network" model, where the value chains are created by connecting customers who are or want to be interdependent. The enterprise itself is not a network, but it provides network services. The network value is considered as a direct product of mediation.

For the network value model, standards are of great importance. In many areas of activity there are common for all standard rules and requirements. This is the minimum requirement for all enterprises to enter the network structure. All enterprises within the network business model must comply with mandatory standards, but the standardization of business can be made even before the company in question officially joins the network structure.

Another element of the value chain is a business layer. A *business layer* is usually used in combination with a strategy for modeling the enterprise architecture, defined as a description of the structure and interaction between strategy, functional organization, business processes, and information needs (Josey *et al*., 2016). As applied to our research, the business layer is the area of interaction between enterprises cooperating within a network structure.

If we consider the business layer in more detail, a conceptual scheme of the chain of creating value of a product innovation in a network business model can be obtained:
− at the first level, there is a chain of value creation; it is a chain, because the graph is not suitable for our "simplified model";
− at the second level, there are horizontal links between the "neighbors" along the chain, that is, "paired" links;
− further at the third level, there are the "attributes"of these links, that is, "capabilities" and "requirements".

The concepts related to the network business model are integrated into the semantic network displayed in Figure 1. The connections between enterprises within the network structures have the form of flows. It is possible to distinguish "workflows", "cashflows", "information flows", etc. Some of the flows can be very closely intertwined, for example, as in the blockchain technology (Pilkington, 2016). Thus, the material exchange between enterprises as a part of network structures is carried out in the form of flows with different contents corresponding to one or another kind of resources.

There are tasks that an enterprise must solve with the highest priority, as well as tasks that an enterprise has the opportunity to outsource. Such "secondary" competencies will be called *peripheral*. The level of key competencies of various enterprises should not be below a threshold value; otherwise such an enterprise should in advance be recognized as not completely competitive. The resources within the network structure should be distributed in such a way as to maximize the key competencies of each of the enterprises, since it is difficult to maximize all key competencies at once for all enterprises. Maximizing the key and delegating the peripheral competencies of individual enterprises is proposed to be implemented through a mechanism of optimizing the configuration of the network structure.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

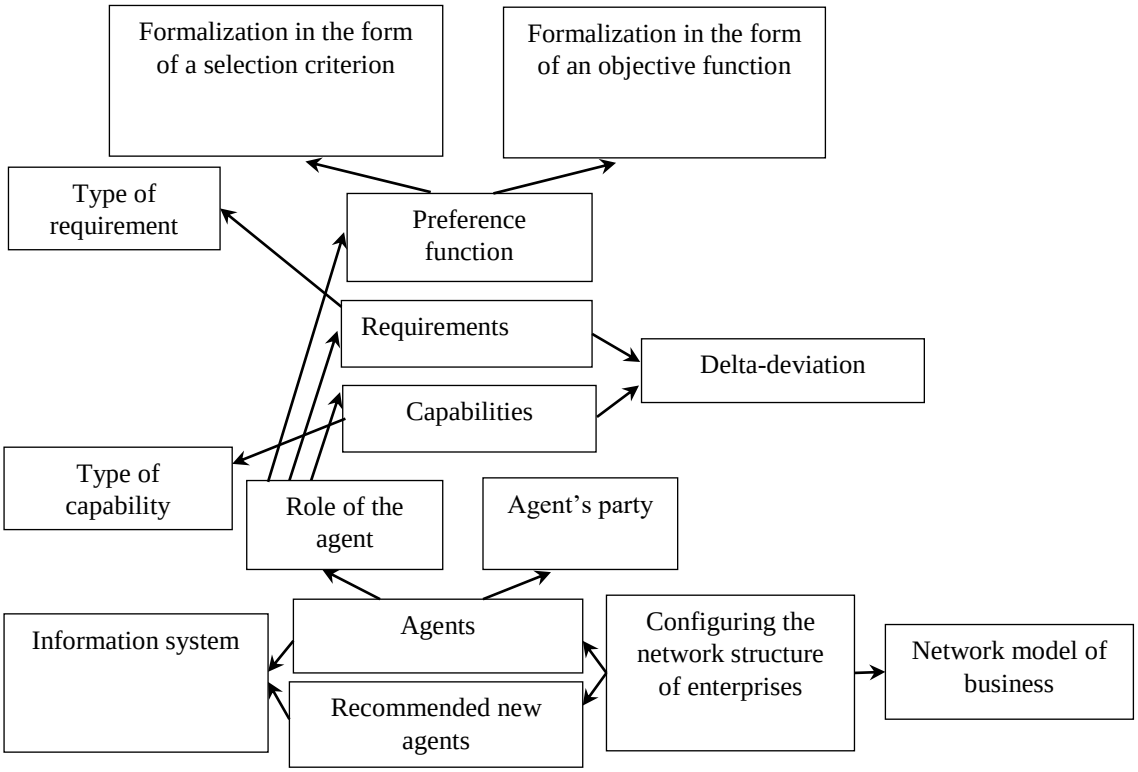


Fig.1. Semantic network of the network model of business [compiled by the authors]

4.2. Methodology for assessing the fuzzy deviation of the capabilities of network agents from the requirements

We are faced with the task of constructing a model that will optimize the configuration of the network structure of enterprises when their own capabilities for creating an innovative product are insufficient; and therefore they are forced to attract additional agents from the outside into the network structure. In the present study, we focus primarily on projects to create product innovations.

Before proceeding directly to economic-mathematical models, it is necessary to settle the issues of terminology in order to avoid confusion in the presentation of further research material: the agent (actor) is a subject that is capable of carrying out active behavior. The role implies responsibility for a particular type of behavior for which an actor can be assigned in a particular action or event (Josey *et al*., 2016); the role is a certain type of agent, generalized according to function. Among the plenty of roles, the following roles should be distinguished: developer, manufacturer, creator, investor, seller, consumer, user, buyer, client, supplier, and contractor.

In the network model of business, two main business groups act, which we will simply call the parties: the "Customer" Φ and the "Executor" Ψ. Each of the two sides can own an arbitrary number of enterprises (agents); in a sense, the roles of agents on both sides can be mixed with each other due to the extreme flexibility of network configurations. Let us assume that the "Customer" is a financial structure that is not a producer.

The "Buyer" party creates a market demand for innovative products in relation to the "Customer" and dictates the requirements for the characteristics of innovative products in relation to the "Executor". In return, innovative

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

products can be supplied to the "Buyer" both from the "Customer" (when the "Executor" is responsible only for R&D) and from the "Executor" (when the "Customer" is an investor, and the "Executor" combines scientific innovation and production activity).

At first glance, when calculating the deviation Δ_p of the capabilities Ξ of enterprises from the requirements Θ from a list of n characteristics, it would be better to use the so-called "Euclidean distance" between the numeric indicators Θ_i and Ξ_i for the i-th characteristics:

$$\Delta_p = \sqrt{\sum_{i=1}^{n} \left(\Theta_i - \Xi_i\right)^2} \tag{1}$$

However, in connection with the fact that, in practice, the list of such characteristics is quite flexible, greatly varying when moving from one possible network structure of enterprises to another network structure, instead of n-dimensional vectors $\vec{\Xi}$ and $\vec{\Theta}$, consisting of indicators, it seems more optimal to use the indicators that we call "delta deviations", calculated using the method of expert assessments.

Delta deviations are indicators whose optimization through objective functions, in our opinion, will be equivalent to following the interests of the network structure as a whole. It should be noted that for enterprises with different roles, delta deviations will be calculated using different methodologies. Meanwhile, these methodologies are united by the fact that, at the output of the delta deviation calculation, fuzzy numbers should be obtained. In addition, delta deviations are always calculated as the difference between generalized capabilities and generalized requirements.

The methods by which the generalized capabilities and requirements will be calculated depend on the type of the particular enterprise-agent (more precisely, on its role in the network structure of enterprises). It should be noted that in spite of the fact that delta deviations are defined for the pairs of enterprises (or agents), they do not commute (and therefore are not permutable) if the order of the elements in the pair is changed. However, this does not mean that all relations between agents should be correctly written only in the form of ordered pairs, in other words, that all connections between agents must be of the form "one-to-one". From the point of view of designing relational databases, it would be much more convenient to use the "one-to-many" kind of relation. For example, one supplier can have relations with several clients at once, which cannot be represented in the given particular case in the form of "one-to-one", for example, if specific, individual contract terms are used for each of the clients.

Thus, it is possible to write down the formula for estimating the delta deviation $\tilde{\Delta}_p$ of the "generalized capabilities" Ξ from the "generalized requirements" Θ as follows:

$$\tilde{\Delta}_p = \varphi\left(\Theta - \Xi\right), \tag{2}$$

where φ is the fuzzification function, that is, the function of reducing the numerical value of the delta deviation Δ_p to a fuzzy form.

The delta deviation $\tilde{\Delta}_p^{dev}$ for the "Executor" party, which may include a number of the role types of the network structure agents, is calculated in the following manner:

$$\tilde{\Delta}_p^{dev} = \varphi\left(\Theta_{req} - \Xi_{cap}\right), \tag{3}$$

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

where Ξ_{cap} are the key competences of the "Executors", corresponding to the capabilities Ξ from (2); Θ_{req} are the requirements of the "Customer", corresponding to the requirements Θ from (2); φ is the fuzzification function.

The delta deviation $\tilde{\Delta}_p^{inv}$ for the "Customer" party is calculated similarly:

$$\tilde{\Delta}_p^{inv} = \varphi\left(\Theta_{risc} - \Xi_{res}\right), \tag{4}$$

where Ξ_{res} is the resource potential of the "Customer", corresponding to the capabilities Ξ from (2); Θ_{risc} are the existing project risks, corresponding to the requirements Θ from (2); φ is the fuzzification function.

For the indicators of capabilities Ξ and requirements Θ, we can specify some interval scales of quantitative values that normalize the estimates of the indicators in the interval $[0,1]$.

The capabilities of the "Executor" Ξ_{cap}, the seriousness degree Θ_{req} of the requirements placed on the Executor should be evaluated by the expert method. The risks Θ_{risc} that arise before the "Customer" should also be estimated using the method of expert assessments:

$$Z_i = \frac{\sum_{j=1}^{N} Ex_{ij}^{*} \cdot W_j}{\sum_{j=1}^{N} W_j}, \tag{5}$$

where in the place of indicator Z_i there can be Ξ_{cap}, Θ_{req} or Θ_{risc}; Ex_{ij}^{*} is the expert assessment of indicator Z_i by the j-th expert; W_j is the weight coefficient of the competency of the j-th expert; $\sum_{j=1}^{N} W_j = 1$; N is the number of experts in the expert commission.

A two-sided scale of risk assessment Θ_{risc} allows taking into account not only the danger and the degree of risk with a bias toward the probability of occurrence, but also the deviations in the opposite direction, reflecting the positive probability of achieving a successful outcome by the object of assessment. Read more on scaling uncertainty and risk in the study Kuzmin (2015). The advantage of a two-sided risk assessment scale is that it combines in the same indicator the likelihood of risk and the likelihood of success, which, in the usual interpretation, are opposite random variables.

The translation of risk assessments from a two-sided qualitative scale to a numerical form is carried out in accordance with Table 1.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

Table 1. Translation of assessments of the Customer's risks from a two-sided qualitative scale to a numerical form [compiled by the authors]

Level of risk value by qualitative scale	Quantitative risk assessment
Has a sharp negative impact	-0.50
Generates appreciable hindrances	-0.25
Has no significance whatsoever	0.00
Contributes to success to some extent	0.25
Creates noticeable positive conditions	0.50

Expert assessments should be carried out according to qualitative scales specified as follows:

$$\{"Very\,low";\ "Low";\ "Normal";\ "Much";\ "Very\,much"\} \rightarrow \{-0.5;-0.25;0;0.25;0.5\} \tag{6}$$

As one can see, initially the expert assessments are proposed to be implemented in both directions, that is:

$$-0.5 \le Ex_{ij} \le 0.5, \tag{7}$$

where Ex_{ij} is non-reduced expert assessment of the i-th indicator by the j-th expert.

Accordingly, the reduced estimate Ex_{ij}^{*} is obtained as follows:

$$Ex_{ij}^{*} = 0.5 + Ex_{ij}. \tag{8}$$

Due to the fact that the distribution of expert assessments is subject to a normal law (Voshchinin , 2004), the fuzzification function φ can be exponential or normal (Gaussian) (Ryzhov, 1998).

The so-called s-function is defined as follows:

$$s(x,\alpha,\beta,\gamma) = \begin{cases} 0 \text{ for } x \le \alpha \\ 2^{\left(\frac{x-\alpha}{\gamma-\alpha}\right)^2} \text{ for } \alpha \le x \le \beta \\ 1-2^{\left(\frac{x-\gamma}{\gamma-\alpha}\right)^2} \text{ for } \beta \le x \le \gamma \\ 1 \text{ for } x \ge \gamma \end{cases}, \tag{9}$$

where α, β, γ are numerical parameters.

The graph of the exponential s-function has the form:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

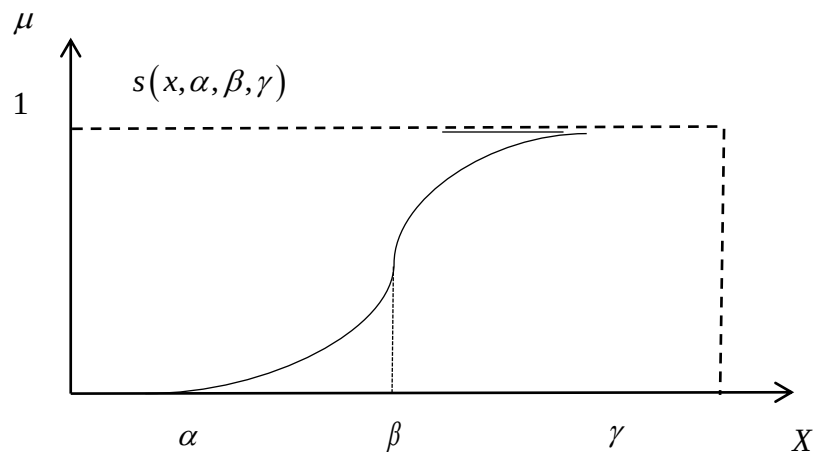


Fig. 2. Graph of the fuzzy set membership s -function in the form of an exponential curve

Source: (Ryzhov, 1998)

The so-called π -function is defined as follows:

$$\pi(x,\beta,\gamma)=\begin{cases} S\left(x;\gamma-\beta,\gamma-\frac{\beta}{2};\gamma\right) & \text{for } x\le\gamma \\ S\left(x;\gamma,\gamma+\frac{\beta}{2},\gamma+\beta\right) & \text{for } x\ge\gamma \end{cases}, \tag{10}$$

where β , γ are numerical parameters.

The graph of the normal π -function has the form:

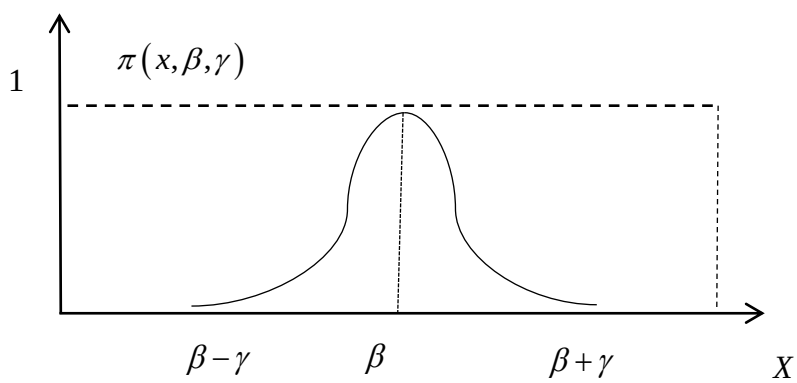


Fig. 3. Graph of the fuzzy set membership π -function in the form of a normal distribution

Source: (Ryzhov, 1998)

In this case, the function φ is also defined for negative values due to displacement along the abscissa coordinate axis; therefore, in Figures 2 and 3, the parameter β should be considered equal to zero.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

The resource potential Ξ_{res} of the "Customer" is estimated by the indicator method using the formula (Kalachikhin, 2014):

$$\Xi_{res} = \sqrt[n]{\prod_{i=1}^{n} \frac{R_i}{C_i}}, \tag{11}$$

where R_i is the quantity of the available resource of the i-th type available for the "Customer", C_i is the quantity of the resource of the i-th type required for the Customer. In this case, n types of resources are taken into account, whereas the number of available and necessary resources is counted by grouping with respect to expenditure items and cost estimates.

The resource potential Ξ_{res} of the "Customer" in relation to the project for the creation of innovative products within the framework of the network structure makes it possible to determine how the allocated resources cover the expected costs.

The block diagram of the algorithm for optimizing the network structure of enterprises on the basis of estimates of fuzzy deviations of the generalized capabilities of enterprises from generalized requirements is shown in Figure 4.

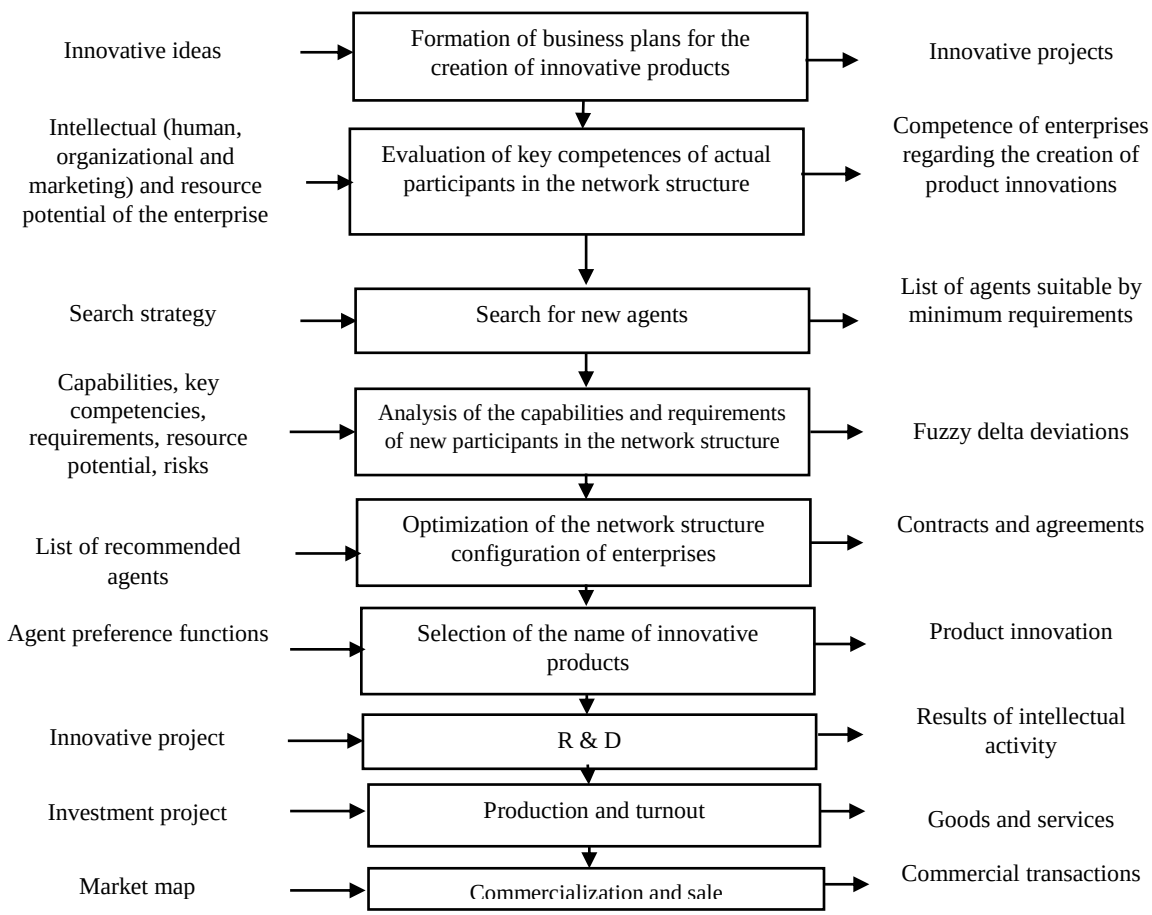


Fig. 4. Optimization algorithm for network structure configuration [compiled by the authors]

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

The parties (participants in the value chain, alias, enterprises-nodes of the network structure) will make efforts to maximize their own benefit. In this case, further relations between the parties will have the form of a chain of transactions, that is, from a proposal to agreement and further to the conclusion of an agreement.

The need for turning to ABC (activity-based costing) is due to several factors. They include new evidence of financial gain, the emergence of new-generation information technology to provide operational information to decision makers. ABC can be used to predict at the operational level whether the amount of allocated resources is sufficient to provide the necessary actions (activities and projects), but the ABC method is not able to reliably measure the short-term impact of management decisions at the operational level (Turney, 2010).

In the cases when operational-level management includes specific simplification and standardization of production processes, the use of ABM (activity-based management) at the strategic level does not offer a reconsideration of competencies; however, neither ABC nor ABM can function if the business activity is not related to cost objects or expenditure items. Strategic changes are important for the enterprise, but cannot be characterized as financial actions, since this term is already defined in ABC and ABM (Armstrong, 2002); therefore, in this context the term transaction is more appropriate.

4.3. Formation of the network structure

The choice of the main and only product innovation in the conditions of limited resources should be carried out on the basis of agent preferences, but for different enterprises the preference functions are different, so they can be written down only in the most general form. In practice, the use of preference functions is equivalent to applying a complex criterion for choosing the best alternative, which in turn is associated with multi-criteria optimization methods.

In their original meaning, the preference functions are associated with the law of diminishing utility and other categories discovered by S. Jevons, C. Menger, L. Walrs and F. von Wieser. We will use the term "preference functions" as a certain generalized criterion that allows any enterprise or some other agent to make the most profitable decisions for choosing, thereby optimizing the objective function of its own effectiveness. Thus, it becomes possible to conclude favorable *contracts* between the "Customer" and the "Executor".

Let us make the convention that each agent must make either a negative decision y^-, refusing to conclude contracts, or a positive decision y^+ on the same issues. In the first case, the utility function of such a solution equals zero, since the agent does not get any benefit, but on the other hand, does not lose anything. In the second case, the agent receives, with some probability V_i, some income D_i, which, generally speaking, may be also negative, that is, a loss. The expected utility function $U(y)$ of such decision y^+ has the form:

$$U\left(y^+\right)=\sum_{i=1}^{k} V_i \cdot D_i \quad , \qquad (12)$$

where the index i runs through the values for each of the possible k scenarios of the development of the innovation project.

Thus, when an agent chooses one of the two alternatives y^- and y^+, it is necessary to be guided by the value of the expected utility function. However, for (12), the determination of a complete set of k scenarios for the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

development of an innovative project, as well as an accurate calculation of the probabilities V_i and expected benefit D_i for each scenario, are connected with difficulties, because there is always uncertainty about the future course of events.

It is exactly for this reason that, to choose an agent preference function, instead of substituting the income D to the von Neumann-Morgenstern function $U(y)$ of expected utility (von Neumann, & Morgenstern, 1970), we will use the delta deviations of the agents generalized capabilities from generalized requirements imposed on them by other participants of the network structure. The fuzzy deviation of generalized capabilities from generalized deviations must be calculated for enterprises in order for each of the parties to assess whether it is profitable to participate in an innovative project.

Each of the enterprise-agents belonging to one of the parties (there may be several such pairs in the value chain) has a certain limit of resources that it needs for further activity, and, based on its own interests, puts forward certain requirements for partners. At the same time, it may happen that the enterprise does not have any information about the market at all, or has such information by using an electronic platform as an information broker when looking for agents. In the first case, with closed access to information about potential agents, the situation is described using the non-cooperative game model (Gubko *et al*., n.d.), whereas the second case of open access to information about potential agents can be considered in the framework of a cooperative game with coalition (Smagin, 2008). In both cases, enterprises will seek to conclude only mutually beneficial contracts. If the terms of the agreement turn out to be mutually beneficial, then enterprises within the network structure should begin to negotiate. During the negotiations, the terms of the mutually presented requirements are repeatedly reviewed. At the same time, from the point of view of creation of innovative products within the whole network structure of the enterprises, the configuration of the network structure formed on the basis of contracts, reflecting some equilibrium solution for each pair of agent enterprises, seems to be the most profitable.

Thus, the parties arrive at conclusion of a mutually beneficial contract in the sense of (Langlois, 1992). In the calculation, the delta deviation of the capabilities and requirements of agents turn out to be closely intertwined, but the creation of an innovative product proves to be beneficial to all parties. Indeed, the "Executor" dictates the cost of the forthcoming works, which is included in the resource potential Ξ_{res} of the customer (4). In turn, the "Customer" sets forth the requirements Θ_{req} that the "Executor" must fulfill (3).

The enterprise can only perform actions that are similar to movement along one or another dimension. One of the limitations of capabilities is that enterprises must connect with other enterprises. This often happens through the most ordinary market contracts. The viewpoint on the capabilities of enterprises assumes that the boundaries of the enterprise are determined (at least partially) by the relative strength of internal and external capabilities, that is, the capabilities within the enterprise, accessible through a contract with other enterprises. Any capability of an enterprise is a matter of knowledge.

In the network structures of enterprises there is a need to coordinate innovations through the production stages. Suppose that an enterprise decides to carry out a specific activity within itself instead of relying on the market. This should mean that the enterprise has an advantage in terms of value in comparison with the market.

On the other hand, all enterprises must rely on the capabilities belonging to others, especially to the extent that the capabilities of others are different from those that the enterprise has. The enterprise is able to acquire different capabilities, additional to those that it already possesses.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

The most vivid examples of the types of network structures of enterprises are production clusters and scientific-innovation networks. A production cluster is defined as a group of commercial enterprises and non-profit organizations involved in purchase and sale agreements, joint technologies and distribution channels (Kozhukhivska et al., 2017). Constancy and diversity have a significant impact on the innovative capabilities of the enterprise clusters (Xu, 2018). Science-innovation networks form an environment that is highly suitable for cooperation, and are usually formed to create innovative products or pursue the goal of technology transfer (Câmara et al., 2018).

Thus, the technology transfer is, in fact, a choice that is up to the enterprise. Instead of producing by oneself, one can teach others how to produce and convince them to act just in that fashion. Similarly, an enterprise that decided to provide entry to the market might have acquired the necessary capabilities of internal production (Langlois, 1992).

Contracts and agreements are concluded in such a way as to minimize both delta deviations $\tilde{\Delta}_p^{inv}$ and $\tilde{\Delta}_p^{dev}$ separately:

$$\begin{cases} \phi\left(\tilde{\Delta}_p^{inv}\right) \to min \\ \phi\left(\tilde{\Delta}_p^{dev}\right) \to min \end{cases} \tag{13}$$

where p is the product innovation; ϕ is the defuzzification function.

The principle underlying the hypothesis of our research, stated earlier, is formalized as follows:

$$\phi\left(\tilde{\Delta}_p^{inv} \otimes \tilde{\Delta}_p^{dev}\right) \to min \tag{14}$$

where ϕ is the defuzzification function; $\otimes$ is the operation of fuzzy multiplication, which according to (Blyumin *et al*., 2002), is defined for fuzzy numbers $\tilde{A}$ and $\tilde{B}$ as follows:

$$\mu_{A\otimes B}(x) = \begin{cases} \sup\limits_{a\in(\mathrm{R}/(0))} \left\{\min\left\{\mu_A(a), \mu_B(x=a)\right\}\right\}, \text{ if } x \neq 0 \\ max\left\{\mu_A(0),\ \mu_B(0)\right\}, \text{ if } x = 0 \end{cases}, \tag{15}$$

where p is the product innovation.

The defuzzification function ϕ in (13) and (14) is defined as the "center of gravity" (Zhdanov, & Karavaev, 2002):

$$\phi\left(\tilde{\Delta}\right) = \frac{\int_{-\infty}^{+\infty} x \cdot \mu(x)\,dx}{\int_{-\infty}^{+\infty} \mu(x)\,dx}, \tag{16}$$

where $\mu(x)$ is a continuous membership function of the values of the fuzzy set $\tilde{\Delta}$, where $\mu(x) = s(x)$ (9) or $\mu(x) = \pi(x)$ (10).

The defuzzification transformation ϕ should be more accurately called a functional (Trenogin, 1980).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(19)

The formula (13) describes the situation of closed access to information about potential agents. The formula (14) describes the situation with open access to information about potential agents. Thus, everything depends on what information the "Customer" and the "Executor" have about each other, so that the parties can find and see each other. When such information is sufficient, it will be easier for enterprises to optimize delta deviations and conclude mutually beneficial contracts. It follows precisely from this that for the effectiveness of the network model of business when searching for agents it is necessary to use the services of information brokers in the form of e-platform services.

To each agent Ψ, we need to put into correspondence the threshold value Δ_{max}^{Ψ} of delta deviation, above which the enterprises are not recommended to go. The configuration of the network structure must be adjusted in such a way that the combinations of delta deviations $\tilde{\Delta}$ of the new agent and its counterparties are optimized when substituting into additive or multiplicative objective functions (13) and (14).

In the course of this study, we touched on the problem of how enterprises should find their counterparties in order to get the opportunity to establish cooperation. We are counting on the idea of creating an intelligent system capable of configuring the network structure of enterprises based on an analysis of their capabilities and requirements with respect to the creation of innovative products with specified properties. In this case, a big plus will be if such a system is able to provide useful and understandable recommendations to users in a convenient form. Such a software tool should be based more on management (as well as on retrieval, detection) of non-formalized knowledge than on intellectual data analysis. All the rest of the work will be undertaken by algorithms created on the basis of production rules and other tools of intelligent systems.

5. Conclusion

The present study is focused on the network structures of enterprises that carry out their activities priarily in the basic high-tech sectors of the economy. In the course of the study, we constructed an economic-mathematical model, based on which it is possible to justify making decisions on attracting additional agents into the network structures of enterprises. We propose to implement such decisions on the basis of analysis of estimates for the deviations of generalized capabilities from generalized requirements for each of the potential new agents.

According to the model of optimizing the configurations of enterprise network structures, at the first step it is necessary to determine whether the joint resource potential of the enterprises included in the network structure is sufficient to create an innovative product with specified characteristics, and if it is not enough, whether it is necessary to attract additional agents, thereby widening the scope of the network structure. Then, at the second step, a decision should be made whether it is worth investing in this innovative product or its development is not profitable. Such a decision should be made on the basis of assessments of key competences of the actual participants in the network structure of enterprises, which in our earlier publications are calculated by the expert method using the production rules of fuzzy logic. A specificity of the economic-mathematical model proposed by the authors is the use of fuzzy sets allowing reducing the degree of uncertainty in the input data for performing calculations.

As a result of critical consideration, we came to the conclusion that a more suitable model is such model, where, instead of a pair of two decisions, only one decision is used, but a more constructive decision concerning which companies need to be invited to successfully create a specific innovative product. For this, it is proposed to use the ontology of the network business model.

Acknowledgements
The study was supported by the Russian Foundation for Basic Research (RFBR), project 16-07-01062.

References

Ansoff, I. (1989). *Strategic Management*. Moscow: Ekonomika.

Armstrong, P. (2002). The Costs of Activity-Based Management. *Accounting, Organizations and Society, 27*(1), 99-120. http://dx.doi.org/10.1016/S0361-3682(99)00031-8

Batkovsky, A.M., Fomina, A.V., Batkovsky, M.A., Bozhko, V.P., Klochkov, V.V. et al. (2015). *Risk Management of Innovative Development of Basic High-Tech Industries*. Moscow: Thesaurus.

Blyumin, S.L., Shuykova, I.A., Sarayev, P.V., & Cherpakov I.V. (2002). *Fuzzy Logic: Algebraic Foundations and Applications*. Lipetsk: Lipetsk Ecological and Humanitarian Institute.

Boynton, A.C., & Zmud, R.W. (1984). An Assessment of Critical Success Factors. *Sloan Management Review, 25*(4), 17-27.

Bozhuk, S.G., Kovalik, L.N., Maslova, T.D., Rosova, N.K., & Teyor, T.R. (2011). *Marketing* (4th ed.). St. Petersburg: Piter.

Câmara, S. F., de Lima, B. B., da Gama Mota, T. L. N., e Silva, A. L., & Padilha, P. (2018). The Management of Innovation Networks: Possibilities of Collaboration in Light of Game Theory. *Business and Management Studies, 4*(2), 24-34.

Chen, N., & Xu, Z. (2014). Properties of Interval-Valued Hesitant Fuzzy Sets. *Journal of Intelligent & Fuzzy Systems, 27*(1), 143-158. http://dx.doi.org/10.3233/IFS-130985

Ensign, P.C. (2001). Value Chain Analysis and Competitive Advantage. *Journal of General Management, 27*(1), 18-42. Retrieved June 5, 2018, from https://legacy.wlu.ca/documents/52329/JGM.pdf https://doi.org/10.1177/030630700102700102

Gruber, T. (1993). *What is an Ontology*? Retrieved June 6, 2018, from http://www-ksl.stanford.edu/kst/whatis-an-ontology.html

Grunert, K.G., & Ellegaard, C. (1992). The Concept of Key Success Factors: Theory and Method. *MAPP, 4*, 505-524.

Gubko, M.V., Novikov, D.A., & Chartishvili, A.G. (n.d.). *Elements of the Theory of Games*. Retrieved June 5, 2018, from http://mtas.ru/start/t_game.pdf

Haughey, D. (2013). *SMART Goals*. Project Smart. Retrieved June 6, 2018, from http://www.co.fairbanks.ak.us/pw/ServiceAreaCommissionerResources/R16-2%20Road%20Review%20-%20Fall%202016.pdf

Josey, A., Lankhorst, M., Band, I., Jonkers, H., & Quartel, D. (2016). *An Introduction to the ArchiMate 3.0 Specification*. White Paper from the Open Group.

Kalachikhin, P.A. (2014). Methodology for Assessing the Innovative Potential of the Results of Intellectual Activity in the Defense-Industrial Complex. *Bulletin of the UMO, 5*, 165-169.

Kozhukhivska, R., Parubok, N., Petrenko, N., Podzihun, S., & Udovenko, I. (2017). Methods of Assessment of Efficiency of Creating Regional Innovative Clusters for Dynamic Development of Economics. *Innovations (open-access)*, 14(3), 302-312.

Kuzmin, E.A. (2015). Individual Scaling and Overall Evaluation of System Uncertainty. Modern Applied Science, 3(9), 34-45.

Langlois, R.N. (1992). Transaction-Cost Economics in Real Time. *Industrial and Corporate Change, 1*(1), 99-127. https://doi.org/10.1093/icc/1.1.99

Liu, L. & Özsu, M.T. (Eds.). (2009). *Encyclopedia of Database Systems*. Springer. https://doi.org/10.1007/978-0-387-39940-9

Mizoguchi, R. (2003). Part 1: Introduction to Ontological Engineering. *New Generation Computing, 21*(4), 365-384. https://doi.org/10.1007/BF03037311

Neumann, J., & Morgenstern, O. (1970). *Game Theory and Economic Behavior* (Trans. from English). Moscow: Nauka.

Orlov, A.I. (2013). On the Development of Statistics for the Objects of Non-Numerical Nature. *Polythematic Science Network Journal of the Kuban State Agrarian University, 93*(9), 1-11. Retrieved June 5, 2018, from http://ej.kubagro.ru/2013/09/pdf/19.pdf

Osterwalder, A. (2004). *The Business Model Ontology − a Proposition in a Design Science Approach (Doctor's Thesis).* Lausanne.

Osterwalder, A., & Pigneur, Y. (2012). *Business Models Generation: A Handbook 'Strategy and Innovator'* (Trans. from English, 2nd ed.). Moscow: Alpina.

Pilkington, M. (2016). Blockchain Technology: Principles and Applications. In F.X. Olleros, & M. Zhegu (Eds.), *Research Handbook on Digital Transformations*. Edward Elgar Publishing. Retrieved June 6, 2018, from https://ssrn.com/abstract=2662660 https://doi.org/10.4337/9781784717766.00019

Porter, M.E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: FreePress.

Prahalad, C.K., & Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review, 68*(3), 79-91. Retrieved June 6, 2018, from https://ssrn.com/abstract=1505251

Ryzhov, A.P. (1998). *Elements of the Theory of Fuzzy Sets and Its Applications*. Moscow: Dialogue-Moscow State University.

Scheer, A.W., & Nüttgens, M. (2000). ARIS Architecture and Reference Models for Business Process Management. *Business Process Management, 1806*, 376-389. http://dx.doi.org/10.1007/3-540-45594-9_24

Smagin, B.I. (2008). *Cooperative Games: Study Guide*. Michurinsk: Publishing House of the Michurinsk State Agrarian University.

Song, C.Y., & Lee, K. (2014). *The Samsung Way: Transformational Management Strategies from the World Leader in Innovation and Design.* New York: McGraw-Hill Education.

Stepnova, L.A. (1992). Studying of Economic Consciousness by the Method of Semantic Differential. *Sociological Research, 8*, 65-71.

Telnov, Yu.F. (2014). Principles and Methods of Semantic Structuring of Information and Educational Space on the Basis of Realizations of the Ontological Approach. *Statistics and Economics, 1*, 187-191. http://dx.doi.org/10.21686/2500-3925-2014-1-187-191

Torra, V. (2010). Hesitant Fuzzy Sets. *International Journal of Intelligent Systems, 25*(6), 529-539. http://dx.doi.org/10.1002/int.20418

Trenogin, V.A. (1980). *Functional Analysis*. Moscow: Nauka.

Turney, P.B. (2010). Activity-Based Costing: An Emerging Foundation for Performance Management. *Cost Management, 24*(4), 33-43. Retrieved June 6, 2018, from http://amagroupl.wikispaces.com/file/view/Activity-Based+Costing+-+An+emerging+foundation+for+Performance+Management.pdf

Voshchinin, A.P. (2004). Problems of Analysis with Indeterminate Data – Interval Character and/or Randomness? In *Proceedings of the International Conference on Computational Mathematics. Workshops.'Interval Mathematics and Methods of Constraint Propagation' (June 21-25, 2004)* (pp. 147-158). Novosibirsk: Publishing House of ICM&MG of SB RAS. Retrieved June 5, 2018, from http://www.nsc.ru/interval/Conferences/IMRO_04/Voschinin.pdf

Xu, M. (2018). The Influence of Alliance Innovation Network Structure upon Enterprise Innovation: A Case Study of China's Energy-Saving and Environment-protection Industry. *International Journal of Business and Management*, 13(2), 208-220.

Zadeh, L.A. (1994). Fuzzy Logic, Neural Networks, and Soft Computing. *Communications of the ACM, 37*(3), 77-84. http://dx.doi.org/10.1145/175247.175255

Zhdanov, A.A., & Karavaev, M.V. (2002). Applications of Fuzzy Logic in the Simulation System of Autonomous Adaptive Control. *Proceedings of the Institute of System Programming, Russian Academy of Sciences, 3*, p. 121-137.

Aleksandr M. BATKOVSKIY, Dr. Sci. (Economics), Senior Researcher, JSC "Central Research Institute of Economy, Management and Information Systems "Electronics", Moscow, Russian Federation. Research interests: economics of industry, management, production efficiency, sustainable systems.
ORCID ID: orcid.org/0000-0002-5145-5748

Pavel A. KALACHIKHIN, Cand. Sci. (Economics), Senior researcher, Institute for Scientific and Technical Information of Russian Academy of Sciences, Moscow, Russian Federation. Research interests: innovative potential, innovative strategy, expert systems, artificial intelligence, scientific information systems, scientometric indexes.
ORCID ID: orcid.org/0000-0002-5467-0080

Elena G. SEMENOVA, Dr. Sci. (Engineering), Professor, Director of the Institute of Innovation and master basic training, Saint-Petersburg State University of Aerospace Instrumentation, St. Petersburg, Russian Federation. Research interests: innovative activity, modeling, sustainable systems, management, applied mathematics.
ORCID ID: orcid.org/0000-0001-8312-4903

Yury F. TELNOV, Dr. Sci. (Economics), Professor, Department of applied Informatics and information security, Plekhanov Russian University of Economics, Moscow, Russian Federation. Research interests: reengineering, enterprise economics, economic and mathematical modeling.
ORCID ID: orcid.org/0000-0002-2983-8232

Alena V. FOMINA, Dr. Sci. (Economics), Assistant professor, JSC "Central Research Institute of Economy Management and Information Systems "Electronics", Moscow, Russian Federation. Research interests: regional economy, industrial economy, development strategies and restructuring, strategic planning, high-tech production structures, industry analysis, financial and economic planning, sustainable economic systems.
ORCID ID: orcid.org/0000-0002-5853-0309

Viktor M. BALASHOV, Dr. Sci. (Engineering), Professor, JSC «Scientific and Production Enterpise "Radar MMS"», Saint-Petersburg, Russian Federation. Research interests: reengineering, enterprise economics, economic and mathematical modeling.
ORCID ID: orcid.org/0000-0003-4642-5701

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

Publisher
http://jssidoi.org/esc/home

SUSTAINABLE REGIONAL DEVELOPMENT POLICY FORMATION: ROLE OF INDUSTRIAL ECOLOGY AND LOGISTICS

Yevhen, Mishenin[1], Inna, Koblianska[2], Viktoriia, Medvid[3], Yuliia, Maistrenko[4]

[1] Sumy State University, 2, Rymskogo-Korsakova st., 40007, Sumy, Ukraine;
[2,3] Sumy National Agrarian University, 160, Herasym Kondratiev st., 40021, Sumy, Ukraine
[4]Kiev University for Market Relations, 26-B, Bereznyakivskaya street, 02152, Kyiv, Ukraine

E-mails:[1] eugeniy_mishenin@yahoo.com; [2]koblyanska2@gmail.com; [3]viktoriya.medved.snau@gmail.com; [4]Leluka@ukr.net

Received 9 April 2018; accepted 6 July 2018; published 30 September 2018

Abstract. The impossibility to define the clear and uniform operational guidelines for the implementation of sustainable development policy globally proves the necessity to consider the regional level as the key in terms of developing and implementing modern models of sustainable development, in particular, eco-industrial parks and circular economy projects. It substantiates the need to develop and use the modern innovative methodological approaches to the formation of the relevant regional policy. The circular economy proceeds from the flow-based understanding of the character of the production, distribution, exchange, and consumption of goods in the socio-economic system and, consequently, the turnover of resources and energy within this system. It determines the need for complex analysis and regulation of material and energy flows. These issues constitute the scope of research of industrial ecology and, at the same time, logistics. This causes the question of the integration of these disciplines within the system of scientific and methodological support of the processes of formation and implementation of the policy of sustainable region's development that is as yet little investigated. The article studies the theoretical and methodological foundations of the industrial ecology and logistics, such as objects, goals, methodological principles and approaches, methods, organizational forms, etc. On this basis the ontological unity of these disciplines is brought to light: they simultaneously study the different, mutually reinforcing aspects of the industrial system's performance through the accentuation of the flow form of the organization of the movement of resources, information, and energy as an object of regulation in such system. The integration of the "environmental" vision of material flows of the regional system, as is characteristic of the industrial ecology, with their "economic" content, which characterizes the structure of the regional economic system and constitutes the object of the logistics studies, should be considered as the basis for the formation and implementation of the policy aimed to achieve the region's sustainable development goals.

Keywords: management of flows; flow thinking; industrial ecology; logistics, region's sustainable development; circular economy; regional policy

Reference to this paper should be made as follows: Mishenin, Y.; Koblianska, I.; Medvid, V.; Maistrenko, Y. 2018. Sustainable regional development policy formation: role of industrial ecology and logistics, *Enterpreneurship and Sustainability Issues* 6(1): 329-341. http://doi.org/10.9770/jesi.2018.6.1(20)

JEL Classifications: Q01, B41, Q57, R58

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

1. Introduction

The achievement of the sustainable development, which remains more of a political argument (Kronenberg 2006, p.100), requires the introduction of practical models and mechanisms for the development of business, regions, and countries in a sustainable manner. The impossibility to define the clear and uniform operational guidelines for the implementation of sustainable development policy globally proves the necessity to consider the regional level as the key in terms of developing and implementing modern models of sustainable development, in particular, eco-industrial parks and circular economy projects (Korhonen et al. 2018). On this level, it is ensured the effective implementation of the institutional power to solve a specific, local complex of socio-ecological and economic problems of the territory. In this context, the main focus should be given to the development and use of the modern innovative methodological approaches to the formation of the relevant regional policy.

The circular economy seen as a form of interorganizational, environmentally sustainable management (Korhonen et al. 2018) is based on the flow-based understanding of the character of the production, distribution, exchange, and consumption of goods in the socio-economic system and, consequently, of the turnover of resources and energy within this system (Mishenin & Koblianska 2017). From this perspective, the need for the complex study of the material and energy flows in an industrial system becomes apparent. This determines the importance of the use of the concept of industrial ecology as a methodological basis for the formulation and implementation of policies aimed to achieve the environmental goals of such systems functioning (Hond 2000; Korhonen et al. 2018; Seuring 2004). On the other hand, the content and character of the relationships of economic agents, integrated into a single flow of consumer value creation, are disclosed through the study of material and energy flows within the framework of the logistics methodology. The latter aims to ensure the optimal composition and structure of flows in terms of system-wide (full) costs (or profit). The unity of the flow-based essence of these scientific disciplines raises the question about the possibility of their integration within the system of scientific and methodological support of the processes of formation and implementation of the policy of sustainable region's development that is as yet little investigated.

As it follows from results of the latest scientific research in this field, the forms of logistic organization and corresponding models of logistic management, in particular, environmental (Seuring 2004), ecological and ecologically sustainable (Kan 2007; Leigh & Li 2015; Wichaisri & Sopadang 2017), green (Sarkis 2012; Zhu et al. 2008), closed-loop (Hernández-Hernández & Montoya Torres, 2011) supply chains are seen as one of the forms as well as the prerequisite for the implementation of the industrial ecology principles, indicating the interconnection of these disciplines. The participants within these chains are tied by the material and energy flows formed along the product life cycle (Kan 2007; Seuring 2004). These flows, as well as relationships between participants and their decisions concerning these flows, constitute the scope of industrial ecology studies. Industrial ecology focuses on a cohesive vision of physical flows of materials and energy to reduce environmental impacts within the industrial system, and therefore, commercial aspects and business relationships are not considered as the key issues (Kovács 2017). The main focus is on the assessment of the environmental aspects of flows that serves as a basis for governance and policy-making through green industries innovations (Korhonen 2002; Melnyk & Kubatko 2013). At the same time, the methodological principles of logistics based on the systemic study of flow processes provide the understanding of the formation and development of such integrated structures in terms of economics (Kan 2007; Møller 1995; Seuring 2004). While the assessment of the total costs related with flows in networks and economic valuation of environmental goods and services is seen as a driver for the development of eco-industrial parks (Dea & Freeman 1995; Melnyk & Kubatko 2012) as well as an important factor of the development of green supply chains (Sarkis 2012; Seuring, 2004) and models of industrial symbiosis (Chertow & Ehrenfeld 2012), the logistic design should be considered as a tool for systematic planning and implementation of industrial ecology models, ensuring their effective functioning both in terms of environmental impact and costs (Dea & Freeman 1995, p. 85). However, this issue has not been explored enough. The lack of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

scientific investigation stipulates the expediency and necessity of a more detailed, thorough and joint study of the methodological principles of industrial ecology and logistics in order to determine the possibilities of their integration as the basis for the formation of the effective and efficient policy of sustainable development of the region that constitutes the goal of this study.

2. The industrial ecology foundations

In its essence, the industrial ecology implies the metaphorical transfer of ecosystem's functioning vision into the sphere of industrial development. From the standpoint of industrial ecology, the industrial system appears as an ecosystem, where companies are viewed as organisms, and which is seen as an integral part of the natural system (Ashton 2009). Accordingly, the principles of functioning and development of the industrial system are formulated based on the simulation of natural patterns: the establishment of the sufficient and cyclical models of resources and energy use, the support of diversified forms of economic agents as well as the simulation of the natural ways of intercommunication (symbiosis through the cooperation) (Kronenberg 2006). The consideration of an economic system as a part of the natural (Constanza et al. 1991) highlights the issues of regulating the metabolism of the economic system (industrial metabolism), i.e., the flows of the substance, energy and information circulating in the sphere of production and consumption as well as between the economic and the natural systems and regarded as a part of natural material-energy cycles (Baccini & Brunner 2012; Korhonen 2002). The systemic analysis and regulation of these flows constitute the methodological basis for the research in the field of the industrial ecology (Hond 2000; Korhonen 2002; Schiller et al. 2014). The paper by Sineviciene et al. 2017 states that institutional factors, e.g. EU accession and common European energy policy are important factors that stimulate energy efficiency improvements. One should emphasize the difficulty of a distinct identification of the content (parts) of these flows, which is determined by the time, spatial and cultural attributes (Korhonen et al. 2018).

The main objective of the industrial ecology is to reduce the environmental impact associated with the functioning of the industrial system. This presupposes the optimization of the utilization of materials and energy through the minimization of waste in cascading and cyclic models of resources use (e.g. wastes and by-products), the elimination (or at least the minimization) of the toxic substances implication as well as the priority of the applying of natural materials and natural ecosystems functions (Hond 2000; Korhonen 2002; Kronenberg 2006). It should be emphasized that from the standpoint of industrial ecology economic goals appear as secondary, to some extent consequential, additional results (Korhonen 2002; Kovács 2017). This is the main argument for the critique of industrial ecologists (Desroches 2002; Kronenberg 2006).

In addressing the objectives of the industrial ecology, special attention is paid to the life cycle analysis (LCA) (Hond 2000; Korhonen 2002; Seuring 2004). This tool, being used to assess the full environmental impact formed within the product movement system (design-production-distribution consumption-utilization), creates the space of alternatives concerning cooperation of various participants within the industrial system. The substance/material flows analysis are the other important approaches used to evaluate the "environmental price" of current production models (Baccini & Brunner 2012; Sarkis 2012).

A distinctive feature of the industrial ecology is a fundamental paradigm shift that centers around the understanding of the interconnection of industrial processes, and hence, the necessity to consider the industrial-environmental relations in order to reduce the negative environmental impact of the system in a whole (Boons & Baas 1997; Hond 2000). Thus, the focus should be paid not to the individual production processes, i.e. sources of pollution where the strategy of prevention and control is applied, but to the interprocess and inter-organizational (inter-firm) interactions (Hond 2000; Walls & Paquin 2015). Therefore, the problem of coordination of actors and

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

their activities (processes) is one of the central problems in the industrial ecology concept implementation (Boons & Baas 1997, p. 79).

The region is an "ideal way" of the implementation of the philosophy of industrial ecology (Korhonen 2002, p. 49), as the classic examples in Calundborg and Styria province show (Desroches 2002; Ehrenfeld & Gertler 1997; Ehrenfeld 2000). Although in the regional system different actors are not directly interconnected in their key activities (Baas & Boons 2004; Korhonen 2002), the physical proximity is an important factor of the development of cooperation for the use of material and energy resources (waste and by-products) (Baas & Boons 2004; Hond 2000; Korhonen 2002; Korhonen et al. 2018; Kronenberg 2006), i.e. the "industrial symbiosis" models, where the distinctive feature is the formation of a system-wide environmental result as a consequence of the interactions of the economic agents (Chertow & Ehrenfeld 2012). Such a regional system, which operates as an eco-industrial park (EIP), can be relatively easily controlled and managed from the point of view of the involved actors. The presence of government coordinating institutions is an important factor in its development (Baas & Boons 2004; Boons & Baas 1997; Chertow & Ehrenfeld 2012; Walls & Paquin 2015).

An important problem of the practical implementation of the industrial ecology principles is the role of government institutions in this process. This may include, in particular (Baas & Boons 2004; Chertow & Ehrenfeld 2012; Desroches 2002; Ehrenfeld & Gertler 1997; Walls & Paquin 2015; Wolf et al. 2007):
- the creation of the opportunities for EIP's development, in particular, through the establishment of standards for the resources exchange, the regulation of resource ownership and pricing policies, the simplification of environmental regulatory requirements and permitting procedures in the field of waste management;
- the stimulating of the development through the creation of tax incentives and subsidies allotment, the formation of special funds for financing the development of the EIP;
- the coordination of the network structures functioning through the implementation of intermediary functions for the information exchange, which will facilitate the reduction of transaction costs.

It is clear that the formation of institutional drivers for the development of the EIP should be based on the perception of the drivers of the industrial symbiosis models development. Particularly, the existing inter-firm relations including formed in the process of conquering new market opportunities, supply, and product distribution networks (Chertow & Ehrenfeld 2012) are seen as the preconditions and basis for the formation of industrial symbiosis models (Baas & Boons 2004). As Desroches (2002) and Ehrenfeld & Gertler (1997) highlight, the models of industrial symbiosis appear as the result of business-to-business agreements fed on the economic interests primarily (for example, seeking the ways to reduce waste management costs, to get access to the cheaper resources, and to obtain the additional income) (Desroches 2002; Ehrenfeld & Gertler 1997). It is emphasized that environmental benefits are of secondary importance, being valued, to a greater extent, in terms of gaining consumer loyalty and trust of the institutions (Desroches 2002). Therefore, the policy must focus on creating the right economic context for the development of industrial symbiosis models and the formation of an EIP first and foremost.

The forming-up of the inter-firm relationships essentially depends on the level of transaction costs. In the exchange of by-products and wastes process, such costs include the exploratory, regulatory, contractual and control costs (Chertow & Ehrenfeld 2012; Ehrenfeld & Gertler 1997). These costs reflect the "economic" dimension of material and energy flows as objects of the industrial symbiosis. This means that for the private agents the material and energy flows are primarily measured within the categories of transaction costs, transportation costs, cost of resources and their disposal. The level of these costs, compared with the potential revenues is the basis for the implementing of strategies that substantially comply with the concept of industrial ecology (i.e. models of industrial symbiosis). Ultimately, this will ensure the development of eco-industrial parks. The transaction costs minimization is also important in terms of interregional security, since their minimal levels

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

would guaranty economic, social and environmental convergence (Melnyk & Kubatko 2016). From these positions, it is obvious that the space of alternatives, formed by the institutional environment, should be based on the systemic and complex studies of flow processes in the light of the whole set of their measurements: ecological, social and economic as well. This will enable us to resolve the existing contradictions between the public (in this case, environmental) and private (economic) goals. However, the point to be emphasized is that understanding of the economic actors' decisions and their determinants is one of the main challenges for the industrial ecology (Baccini & Brunner 2012; Kronenberg 2006) as the set of its tools and methods is insufficient to address it completely. For example, the LCA captures only the substance and form of the product related environmental impact. It does not make it possible to identify the factors (economic) of its minimization. The analysis of the composition and structure of energy and material flows (i.e. MFA) is not enough to make a decision on how to promote the integration as well as the formation and development of a local industrial ecosystem (Wolf et al. 2007, p. 454). In this context, the field for the application of the logistics methodology as a scientific discipline associated with material and energy flows researched in their economic essence is coming into being.

3. The fundamentals of logistics

The modern logistics as an interdisciplinary science (Delfmann et al. 2010; Klaus 2009; Kovács & Spens 2005; Malindžák 2014; Møller 1995) comes from many scientific traditions and shaped by the influence of the economic and behavioral approaches (Arlbjørn & Halldorsson 2002). The logistics concept originates mainly from the marketing, management, engineering (Kovács & Spens 2005), business administration, economics, computer and social sciences (Delfmann et al., 2010), microeconomics and organization theory disciplines (Møller 1995). In a broad sense, the logistics appears as a "flow management philosophy" (Malindžák 2014, p. 47), the science about complex flows in networks, focused on the design, dynamics and management of these structures, that contributes to the growth and retention of "The Wealth of Nations" (Delfmann et al. 2010). More specifically, logistics is a branch of science related to managing, guaranteeing, and implementation of flows in chains and networks for the purpose of their global optimization (Malindžák 2014, p. 47). The methodology of logistics is aimed to model economic systems as networks, analyze their relationships thus to form the information basis for their optimal design (Møller 1995) and development in order to ensure progress in the balanced achievement of economic, environmental and social goals (Delfmann et al. 2010).

The flow thinking is the central element and a distinctive feature that defines the essence of the logistics as a discipline (Delfmann et al. 2010; Malindžák 2014; Arlbjørn & Halldorsson 2002). This means that economic processes are considered as the flows of objects (Delfmann et al. 2010) that are studied from the technical, organizational and social points of view. The logistics is based on a systemic approach (Delfmann et al. 2010; Karatas-Cetin & Denktas-Sakar 2013; Klaus 2009; Malindžák 2014; Nilsson & Gammelgaard 2012; Novack et al. 1992; Arlbjørn & Halldorsson 2002) and its scientific toolkit provides the space and time coordination of processes (Delfmann et al. 2010; Malindžák 2014) being focused on the inter-organizational interactions (Møller 1995) as well as on the issues of flows mobilization and control while studying the optimal configuration and organization of economic networks models (Delfmann et al. 2010). One should emphasize that the economic approach as one of the mainstays of the logistic concept focuses on full costs minimization (or profit maximization) (Karatas-Cetin & Denktas-Sakar 2013; Arlbjørn & Halldorsson 2002) as a criterion for such optimization modeling. The logistic flows are understood as a controlled movement of objects between cooperative elements (machines, activities, people, workplaces, etc.) linking them in chains and networks (Malindžák 2014, p. 49). The flow composition depends upon the objects (materials and substances) forming it as well as the context. The elements, as a rule, include the material objects such as raw materials, work in progress, finished products, goods as well as information and services flows (Klaus 2009; Arlbjørn & Halldorsson 2002). At the same time, the composition of the flow elements can vary depending on the context in which they are

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

investigated (i.e. level of analysis and purpose) (Arlbjørn & Halldorsson 2002, p.25). This allows to cover the waste streams, gas-energy emissions and wastewater, services (including ecosystem), in particular, in view of the environmental objectives of logistics system analysis (Mishenin et al. 2015; Linton et al. 2007; Sarkis 2012), as well as people, services, finance, information and knowledge (Delfmann et al. 2010; Klaus 2009; Malindžák 2014; Sarkis 2012) in the studying of the logistics systems in socially important sectors: healthcare, education, etc. (Delfmann et al. 2010; Klaus 2009; Kubatko & Kubatko 2016).

At the same time, the material flow is the main object in logistics considered as a system-forming, integrating a variety of activities factor, that broadly speaking, covers the full product lifecycle: from developing an idea to the final disposal of waste of consumption. The material flow simultaneously reflects the horizontal - the functional dimension of the logistics system, i.e. supply, production, distribution, service, etc. (Møller 1995). The basic tools and methods in the logistics are simulation and modeling. The most often used include the models of logistic flows, plans scheduling, decision making, optimization etc. (Malindžák 2014). The modeling of system dynamics also is used to study the relationships, organization and integrated development of logistic structures (Angerhofer & Angelides 2000). It should be stressed that the life cycle analysis (Life Cycle Cost Analysis (LCCA), is also one of the main methods of the design of logistics system used to analyze costs (Dea & Freeman 1995). The above analysis shows that the logistics forms the scientific and methodological basis for the modeling of an efficient system in terms of full costs, while also providing an optimal set of products and services that meet the needs of the consumer.

4. The use of the industrial ecology and logistics methodologies to build the region's sustainable development policy

In view of the aforesaid, the question arises about the possibility to form an integrated, complex "conceptual" space for the development of the policy of region's sustainable development based both on the industrial ecology and the logistics as flow sciences. To investigate the interconnection of these disciplines we are going through the generalization and comparison of their basic provisions (Table 1).

Table 1. The comparative analysis of the fundamentals of industrial ecology and logistics as sciences

Criterion	Industrial Ecology	Logistics
Object of investigation	The material and energy flows in industrial systems (networks)	The material, energy, information, service, finance, people and knowledge flows in economic systems (networks)
Problem scope of research	The inter-organizational relationships, coordination	The inter-organizational relationships, coordination
Focus of the research	Environmental impact	Full costs size
Methodology	Systemic approach Theory of complexity	Systemic approach Theory of complexity
Goal	System optimization from the environmental impact point of view	System optimization from the full cost minimization point of view
Methods and tools	LCA (environmental impact), analysis (models) of material (substances) flows	LCA (cost analysis), flow models, optimization methods
Organizational forms	Product (supply) chain, regional system	Enterprise, supply chain, regional system
System types	Complex, adaptive, self-organized	Complex, adaptive, self-organized
Modeling approaches	Flow approach Behavioral approach Process approach Actors' approach	Flow approach Behavioral approach Process approach Economic approach
Discipline's type	Normative, applied	Explanatory, applied

Source: authors' generalization

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

The outlined above (table 1) suggests that industrial ecology and logistics are scientific disciplines that simultaneously examine various aspects (environmental impact and costs) of the industrial networks functioning through the emphasizing of the flow form of organization of the movement of resources (materials) and energy in these systems. The conceptual model for the mapping the relationship between these two disciplines is depicted in Fig. 1

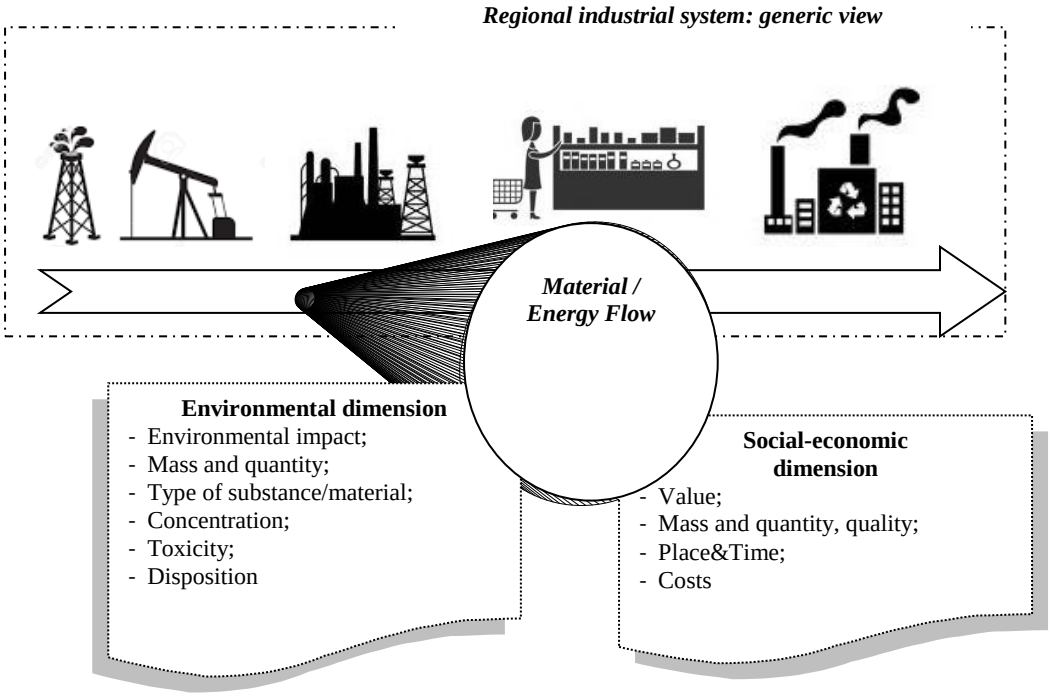


Fig.1. The multidimensional view of material/energy flow in the regional industrial system

Source: authors' development

Thus, the Fig. 1 illustrates that the material and energy flow in the regional system is a multidimensional thing. It exists in biophysical terms and hence has the "environmental" characteristics determined by the mass and quantity, type of substance, the degree of concentration, toxicity, and place of disposal. At the same time, it is valuable from the standpoint of the role in the socio-economic system and is measured by the consumer's value, costs of resources, transport costs, costs of management (disposition), etc. The logistics, considering the "socio-economic" dimension of flow processes and their system-wide economic optimization, can thus serve as a methodological basis for the formulation and implementation of policy aimed to achieve a set of region's sustainable development goals such as: the economic development (through the minimization of resource flow costs that leads to the improvement of the competitiveness of goods and services produced regionally), the social welfare and wealth of the population (through the provision of the supply of goods and services of the required quality with a minimum level of costs in accordance with the needs of consumers completely and in time), as well as the environmental goals through the minimization of the environmental impact of optimized production and consumption flow processes in the region.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

The implementation of the logistics approach when managing the regional development requires considering all processes and components that constitute the region's economy as the elements of a regional logistic system. These typical elements include the spheres of production, supply, distribution, consumption, and disposal, integrated into a single flow of resources movement from the primary source (extraction of natural resources) to the production and consumption wastes disposal, and reflect the functional areas of logistics management in the region. Full cost analysis should be complemented by the environmental assessment of all stages of the resource flow movement. The latter requires taking into account the "environmental" dimension of material and energy flows in the process of the design and management of a regional logistics system. This needs the transformation of the "environmental" meaning of the material and energy flows into the corresponding social-economic value on the basis of a more complete, more realistic assessment of the natural goods (resources and conditions) from the point of view of their public value (for example, the providing, supporting, restorative functions) and will allow to consider waste and by-products as the full-fledged components of material and energy flows in the system of commodity movement, i.e. social-economic system. The systemic projection of the full, environmentally-adjusted social costs should be seen as a part of the search for solutions for the development of eco-industrial parks in a form of a regional logistic system (Dea & Freeman 1995; Quariguasi et al. 2008). The goal here is to optimize the flows within the regional eco-industrial logistic system based on the minimization of the overall social costs associated with the movement and transformation of resources and energy in industrial networks.

In this context, it is possible to propose the following stages of region's policy formation:
1) The identification of the flows in the regional economic system and their analysis with the simultaneous study of the environmental impact at each stage of the resource flow (resource exhaustion, waste and emissions generation, wastewater discharge, emission of pollutants in gaseous forms etc.), thus forming the green economic flows;
2) The analysis and assessment of the public value of natural goods (including ecosystem services as well), taking into account the degree of their scarcity in the region and alternatives of using;
3) The estimation of social costs, associated with resource flows in the region;
4) The optimization of economic flows on the criterion of the full social costs minimization;
5) The formation of the methods and tools of integrated environmental-economic policy and management, which should ensure the optimal state of green economic flows and by that provide the achievement of the environmental goals of the regional industrial system.

The authorities can thus act as a leader in the process of an inefficient regional logistics system restructuring through:
- The strategic planning of the region's development on the basis of a system of socio-ecological and economic indicators (in particular, based on the full social costs, that take into account environmentally related variables);
- The use of the system of economic levers (for example, the pricing and the taxation) based on the proper valuation of natural resources and conditions;
- The administrative regulation of economic activities, including those in the field of natural resources management (for example, the introduction of the system of permits for special use of resources);
- The balanced stimulation of investments and innovative activities;
- The participation of the public sector in the creation of the necessary infrastructure for the collection, reuse, and recycling of wastes, further use of wastes and secondary raw materials (by-products), as well as an implementation of the informational support of these processes;
- The development of public procurement programs for the products made from the secondary and recycled materials for the needs of the community.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

In our view, the use of the logistics methodology combined with the industrial ecology principles to manage ecological-economic relations at the regional level will allow solving the key tasks of regional governing on the innovative bases. Among others, these tasks include: the development of an optimal strategy in the regulation of structural proportions and material flows of public production and consumption in the regional scale; the selection of efficient economic and administrative tools for the optimization of material and related flows of services, finances and information which in turn will contribute to the reducing of the environmental impact throughout the region.

Conclusions

Environmentally targeted regulation of material and energy flows in the regional space that embodies the philosophy of industrial ecology should be considered in the light of the need to ensure the population welfare and from the viewpoint of the economic interests of business agents. Considering logistics as a science of managing the complex flows in networks allows not only to provide the economically high-efficient movement of resources in the socio-economic system, but also to consider the logistics and the industrial ecology arow as the parts of the scientific base aimed to achieve the goals of sustainable development of industrial systems on different hierarchical levels. These two disciplines should be seen as complementary and those that receive a newly integrated vector of development under the conditions of sustainable development paradigm. Within the given context the in-depth insight of the object of management is important. It is the material flow, investigated both in the industrial ecology and logistics, but from different perspectives: the physical and environmental in the view of the industrial ecology and the physical and socio-economic within the framework of the logistics. The integration of these two aspects and thus disciplines' fundamentals should, in our view, serve as a methodological framework for the justification of conditions to be created by the institutional environment for the implementation of policy and mechanisms for the development of regions on a new, sustainable basis.

In the light of this, one should emphasize the need for the ecologically caused improvement of logistics knowledge. This should include, in particular: the methodological basis improvement taking into account the foundations of the ecological economics, environmental ethics, principles of industrial ecology, etc., the goals reframe (i.e. logistics management should be regarded as aimed at achieving a complex of socio-ecological and economic objectives of resource movement and use), the broaden interpretation of the object of logistic management including the waste streams, returned goods, by-products, emissions as well as related information, finances and services, the development of methodical basis for the decision-making through the use of material flows analysis and environmental life cycle assessment tools.

Thus, the integration of the conceptual provisions of logistics and industrial ecology in the context of sustainable development allow to view the eco-industrial parks as the regional logistic systems with the optimal flows structure, where the total social costs associated with the flow of goods (and, accordingly, the natural material and energy resources involved in the process of creating value, expressed in commodity form) are minimized and the environmental impact consequently too. Therefore, there is an obvious need for the further researches concerning approaches to the modeling of complex flows at the regional level taking into account physical, social, economic and environmental variables and their valuations, the methodical tools for evaluating and analyzing the full social costs associated with the resource flow in the regional system, as well as the models and algorithms for making managerial decisions in the public sector.

References

Angerhofer, B. J.; Angelides, M. C. 2000. System dynamics modelling in supply chain management: research review. *The 2000 Winter Simulation Conference*: Proceedings, Vol.1. Ed. by Joines, J. A.; Barton, R. R.; Kang, K.; Fishwick, P. A. December 10-13. Orlando, FL, U.S.A, 342–351. DOI: 10.1109/WSC.2000.899737

Arlbjørn Stentoft, J.; Halldorsson, A. 2002. Logistics knowledge creation: reflections on content, context and processes, *International Journal of Physical Distribution & Logistics Management* 32(1): 22–40. DOI: https://doi.org/10.1108/09600030210415289

Ashton, W. S. 2009. The structure, function, and evolution of a regional industrial ecosystem, *Journal of Industrial Ecology* 13(2): 228–246. DOI: https://doi.org/10.1111/j.1530-9290.2009.00111.x

Baas, L. W.; Boons, F. A. 2004. An industrial ecology project in practice: Exploring the boundaries of decision-making levels in regional industrial systems, *Journal of Cleaner Production* 12(8–10): 1073–1085. DOI: https://doi.org/10.1016/j.jclepro.2004.02.005

Baccini, P.; Brunner, P. H. 2012. *Metabolism of the Anthroposphere: Analysis, Evaluation, Design*. 2nd ed. London: The MIT Press. Access mode: https://mitpress.mit.edu/books/metabolism-anthroposphere-second-edition

Boons, F. A.; Baas, L. W. 1997. Types of industrial ecology: The problem of coordination, *Journal of Cleaner Production* 5(1–2): 79–86. DOI: https://doi.org/10.1016/S0959-6526(97)00007-3

Chertow, M.; Ehrenfeld, J. 2012. Organizing Self-Organizing Systems: Toward a Theory of Industrial Symbiosis, *Journal of Industrial Ecology* 16(1): 13–27. DOI: https://doi.org/10.1111/j.1530-9290.2011.00450.x

Constanza, R.; Daly, H.; Bartholomew, J. 1991. *Goals, agenda and policy recommendations for ecological economics.* Available on the Internet: http://www.uvm.edu/~jfarley/EEseminar/readings/Costanza,%20Daly,%20Barth%201991.pdf

Dea, K. O.; Freeman, G. 1995. Environmental Logistics Engineering: A New Approach to Industrial Ecology. *Total Quality Environmental Management* 4 (Summer): 73–86. DOI: https://doi.org/10.1002/tqem.3310040409

Delfmann, W.; Dangelmaier, W.; Günthner, W.; Klaus, P.; Overmeyer, L.; Rothengatter, W.; Weber, J.; Zentes, J. 2010. Towards a science of logistics: Cornerstones of a framework of understanding of logistics as an academic discipline, *Logistics Research* 2(2): 57–63. DOI: https://doi.org/10.1007/s12159-010-0034-5

Desroches, P. 2002. Eco-Industrial Parks: The Case for Private Planning, *The Independent Review* 33(5): 345–371. Access mode: http://www.independent.org/pdf/tir/tir_05_3_desrochers.pdf

Ehrenfeld, J. R. 2000. Industrial Ecology: Paradigm Shift or Normal Science?, *American Behavioral Scientist* 44(2): 229–244. DOI: https://doi.org/10.1177/0002764200044002006

Ehrenfeld, J.; Gertler, N. 1997. Industrial Ecology in Practice, *Journal of Industrial Ecology* 1(1): 67–79. DOI: https://doi.org/10.1162/jiec.1997.1.1.67

Hernández-Hernández, H. J.; Montoya Torres, J. R. 2011. *From Sustainable Supply Chains to Closed-Loop Systems: A Critical Overview of Scientific Literature.* Available on the Internet: https://www.researchgate.net/publication/265184971_From_Sustainable_Supply_Chains_to_Closed-Loop_Systems_A_Critical_Overview_of_Scientific_Literature

Hond F. D. 2000. Industrial ecology: a review, *Regional Environmental Change* l(2):60-69. Access mode: https://pdfs.semanticscholar.org/5a53/6dea8112c1a8e15c82bd42880d9ea3c037fb.pdf

Kan C. W. 2007. Environmental Supply Chain Management for Textile and Apparel Sector, *Research Journal of Textile and Apparel* 11 (1): 57-70. http://hdl.handle.net/10397/7874

Karatas-Cetin, C.; Denktas-Sakar, G. 2013. Logistics research beyond 2000: Theory, method and relevance, *Asian Journal of Shipping and Logistics* 29(2): 125–144. DOI: https://doi.org/10.1016/j.ajsl.2013.08.001

Klaus, P. 2009. Logistics research: a 50 years' march of ideas, *Logistics Research* 1(1): 53–65. DOI: https://doi.org/10.1007/s12159-008-0009-y

Korhonen, J. 2002. Two Paths to Industrial Ecology: Applying the Product-based and Geographical Approaches, *Journal of Environmental Planning and Management* 45(1): 39–57. DOI: https://doi.org/10.1080/09640560120100187

Korhonen, J.; Honkasalo, A.; Seppälä, J. 2018. Circular Economy: The Concept and its Limitations, *Ecological Economics* 143: 37–46. DOI: https://doi.org/10.1016/j.ecolecon.2017.06.041

Kovács, G. 2017. Circular economy vs. closed loop supply chains: what is new under the sun?, in Moula, Munjur E.; Sorvari, J.; Oinas, P. (Eds.). *Constructing a Green Circular Society*. Helsinki: Unigrafia Oy, 6–13. https://helda.helsinki.fi/bitstream/handle/10138/231630/ebook2017%28pdf%29.pdf?sequence=1

Kovács, G.; Spens, K. M. 2005. Abductive reasoning in logistics research, *International Journal of Physical Distribution & Logistics Management* 35(2): 132–144. DOI: https://doi.org/10.1108/09600030510590318

Kronenberg, J. 2006. Industrial ecology and ecological economics. *Progress in Industrial Ecology* 3(1/2): 95–113. DOI: https://doi.org/10.1504/PIE.2006.010043

Kubatko, O.; Kubatko, O. 2017. Economic Estimations of Pollution Related Cancer and Nerves Morbidity, *International Journal of Ecology & Development*, 32 (1); 33–43. Access mode: http://www.ceser.in/ceserp/index.php/ijed/article/view/4765

Leigh, M.; Li, X. 2015. Industrial ecology, industrial symbiosis and supply chain environmental sustainability: a case study of a large UK distributor, *Journal of Cleaner Production* 106: 632–643. DOI: https://doi.org/10.1016/j.jclepro.2014.09.022

Linton, J. D.; Klassen, R.; Jayaraman, V. 2007. Sustainable supply chains: An introduction, *Journal of Operations Management* 25(6): 1075–1082. DOI: https://doi.org/10.1016/j.jom.2007.01.012

Malindžák, D. 2014. The Basic Principle of Logistic Theory, *Applied Mechanics and Materials* 708: 47–52. DOI: https://doi.org/10.4028/www.scientific.net/AMM.708.47

Melnyk, L.; Kubatko O. 2012. Economic valuation of environmental goods and services in Ukraine, *Actual Problems of Economics*, 138(12): 106–112. Access mode: https://www.researchgate.net/publication/298454313_Economic_valuation_of_environmental_goods_and_services_in_Ukraine

Melnyk L.; Kubatko O. 2013. The EU experience for economic systems adaptation to resource fluctuations through green industries innovations, *Actual Problems of Economics*, 150(12): 36–42. Access mode: https://eco-science.net/downloads/

Melnyk, L.; Kubatko O. 2016. Were Ukrainian regions too different to start interregional confrontation: Economic, social and ecological convergence aspects? *Economic Research-Ekonomska Istrazivanja*, 29 (1); 573–582. https://doi.org/10.1080/1331677X.2016.1174387

Møller, C 1995, *Logistics Concept Development - Towards a Theory for Designing Effective Systems*. PhD thesis. Aalborg Universitetsforlag. Access mode: http://www.forskningsdatabasen.dk/en/catalog/2389389805

Nilsson, F.; Gammelgaard, B. 2012. Moving beyond the systems approach in SCM and logistics research, *International Journal of Physical Distribution & Logistics Management* 42(8/9): 764–783. DOI: https://doi.org/10.1108/09600031211269749

Novack, R. A.; Rinehart, L. M.; Wells, M. V. 1992. Rethinking Concept Foundations in Logistics Management, *Journal of Business Logistics* 13(2). Available on the Internet: https://search.proquest.com/openview/85be26a6665a96268574d5a31675560a/1?pq-origsite=gscholar&cbl=36584

Quariguasi Frota Neto, J.; Bloemhof-Ruwaard, J. M.; van Nunen, J. A. E. E.; van Heck, E. 2008. Designing and evaluating sustainable logistics networks, *International Journal of Production Economics* 111(2): 195–208. DOI: https://doi.org/10.1016/j.ijpe.2006.10.014

Sarkis, J. 2012. A boundaries and flows perspective of green supply chain management, *Supply Chain Management: An International Journal* 17(2): 202–216. DOI: https://doi.org/10.1108/13598541211212924

Schiller, F.; Penn, A. S.; Basson, L. 2014. Analyzing networks in industrial ecology - A review of Social-Material Network Analyses, *Journal of Cleaner Production* 76: 1–11. DOI: https://doi.org/10.1016/j.jclepro.2014.03.029

Seuring, S. 2004. Industrial Ecology, Life Cycles, Supply Chains: Interrelations, *Business Strategy and the Environment* 13: 306–319. DOI: https://doi.org/10.1002/bse.418

Sineviciene L.; Sotnyk I.; Kubatko O. 2017. Determinants of energy efficiency and energy consumption of Eastern Europe post-communist economies, *Energy & Environment*, 28(8): 870–884. https://doi.org/10.1177/0958305X17734386

Walls, J. L.; Paquin, R. L. 2015. Organizational Perspectives of Industrial Symbiosis: A Review and Synthesis, *Organization and Environment* 28(1): 32–53. DOI: https://doi.org/10.1177/1086026615575333

Wichaisri, S.; Sopadang, A. 2017. Integrating sustainable development, lean, and logistics concepts into a lean sustainable logistics model, *International Journal of Logistics Systems and Management* 26(1): 85-104. DOI: https://doi.org/10.1504/IJLSM.2017.080631

Wolf, A.; Eklund, M.; Söderström, M. 2007. Developing integration in a local industrial ecosystem - an explorative approach, *Business Strategy and the Environment* 16(6): 442–445. DOI: https://doi.org/10.1002/bse.485

Zhu, Q.; Sarkis, J.; Lai, K. 2008. Green supply chain management implications for "closing the loop", *Transportation Research, Part E: Logistics and Transportation Review* 44(1): 1–18. DOI: https://doi.org/10.1016/j.tre.2006.06.003

Мишенин Е.В.; Коблянская И.И. 2017. Перспективы и механизмы развития «циркулярной» экономики в глобальной среде [Mishenin, Ye. V.; Koblianska, I.I. 2017. Perspectives and mechanisms of "circular" economy global development], *Маркетинг і менеджмент інновацій* [*Marketing and Management of Innovations*] 2: 329-343. DOI: https://doi.org/10.21272/mmi.2017.2-31

Мішенін, Є. В.; Коблянська, І.І.; Мішеніна, Н.В. 2015. Стратегія реалізації екологоорієнтованого логістичного управління виробничою системою підприємства [Mishenin, Ye. V.; Koblianska, I.I.; Mishenina, N.V. 2015. Strategy of implementation of ecologically-oriented logistical management of enterprise production system], *Економічний часопис – XXI* [*Economic Annals-XXI*] 3-4 (1): 64-67. – Access mode: http://nbuv.gov.ua/UJRN/ecchado_2015_3-4%281%29__16

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(20)

Yevhen MISHENIN
ORCID ID: orcid.org/0000-0003-1597-3270

Inna KOBLIANSKA
ORCID ID: orcid.org/0000-0002-7844-9786

Viktoriya MEDVED
ORCID ID: orcid.org/0000-0002-2257-6276

Yuliia MAISTRENKO
ORCID ID: orcid.org/0000-0003-1291-016X

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

Publisher
http://jssidoi.org/esc/home

THE IMPACT OF OUTSOURCING IMPLEMENTATION ON SERVICE COMPANIES

Rima Zitkiene[1], Ugne Dude[2]

[1,2] Mykolas Romeris university, Ateities str. 20, Vilnius, Lithuania

E-mails:[1] rizit3@mruni.eu; [2]ugne@mruni.eu

Received 15 March 2018; accepted 7 July 2018; published 30 September 2018

Abstract. Outsourcing, as a managerial phenomenon, is gaining importance and attention among both scientists and entrepreneurs. Despite an increasing outsourcing practice among business units, the nature of factors affecting growth of the use of outsourcing on service companies have not received adequate attention in the scientific literature. The aim of paper is to provide in-depth analysis of factor affecting the spread of outsourcing practice among service companies. A comprehensive review of the literature was conducted in the fields of services, to achieve a thorough understanding of the issues involved, and identify the crucial factors affecting the use outsourcing in service companies. Literature analysis shows that spread of outsourcing is affected by external and internal factors. Most important internal factors affecting growth of outsourcing use in service companies are strategic and economic factors.

Keywords: outsourcing; service companies; services; service management; business management; business

Reference to this paper should be made as follows: Zitkiene, R. Dude, U. 2018. The impact of outsourcing implementation on service companies, *Enterpreneurship and Sustainability Issues* 6(1): 342-355. http://doi.org/10.9770/jesi.2018.6.1(21)

JEL Classifications: M11, M16, M19, L14, L22, L24, L26, L80

1. Introduction

An examination of the activities of modern organisations shows a visible transformation of business when new business organisation models and methods are applied. In a dynamic and competitive international market, entrepreneurs are constantly looking for ways to save money, improve the quality of products and services, and increase the efficiency of their business in order to keep business and to compete successfully. Historically, companies were vertically integrated organisations seeking to control both supply and distribution channels. Products were made from raw materials and transported to own retail stores (Gerbl, McIvor, Humphreys 2009). Gradually companies began to separate business processes and outsource them to other companies or countries. According to Fuschi, Tvaronavičienė (2016), in a network structure, a central core leader operates the main strategic business and outsources the functional work, such as manufacturing, marketing and distribution. This decreases control but typically increases cost effectiveness. Pauceanu (2016) claims that innovation is a critical weapon for entrepreneurs attempting to find new opportunities of producing better goods or services. Scientific

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

studies show that the service sector is dynamic, and that innovation encourages changes in companies, these changes being increasingly linked to outsourcing. Researchers of the manufacturing and supply chain argue that outsourcing evolved from a make-or-buy decision. Service operations management researchers tend to consider outsourcing as a new revolutionary trend (Busi, McIvor, 2008).

Due to advancement of information and communication technologies and liberalisation of international trade, outsourcing of services has started to expand rapidly including more and more activities (UNCTAD, 2004). According to Alajaasko (2006), outsourcing is one of the reasons for the growth of the service sector and increasing demand for services. Based on the overview of multi-year UNCTAD Expert Meeting on Trade, Services and Development held in Geneva in 2017, between 1980 and 2015 the share of services in GDP increased for all categories of countries: from 61 to 76% in developed economies and from 42 to 55% in developing economies. Outsourcing is a business paradigm in which an organisation transfers part of its business processes to a service provider. The structure of outsourcing is very complex since it covers a wide range of activities and functions that cause administrative and managerial dilemmas (Yi, Chen, Guo, 2016).

With increasing practical application of outsourcing, this phenomenon started to attract the interest of many researchers. Studies of different researchers all over the world (Aubert et al. 1996, Bumberg 1998, Ghodeswar, Vaidyanath 2008, Gomez J. F. et al. 2009, Kishore et al. 2003, Koszewska 2004, Choi, Beladi 2012, Lankford, Parsa 1999, Franchesi et al. 2003, Kremic et al. 2006) show that companies tend to outsource increasingly more often.

Due to changes and development of outsourcing, scientific literature employs various scientific theories, which aim at explaining the outsourcing phenomenon and the factors that determine its development. Scientific theories provide the basis for the analysis of outsourcing development factors. However, in the course of the research, it has been observed that when outsourcing is changing, i.e. as it expands, the expectations of companies and factors that determine the use of outsourcing change as well. At first, outsourcing was only expected to help minimise the costs and compensate for temporary workforce shortage. However, in the process of globalisation, manufacturing and service companies are increasingly expanding their activities in order to stay in the market, thus providing not only basic but also additional services. The researchers point to various factors that determine the development of business activities, however, their main focus is mainly on manufacturing. Nevertheless, the specifics and development of the service sector promotes research in this sector and the pursuit of a unified approach towards the factors affecting an increased use of outsourcing in service companies.

The aim of this article is to reveal theoretical background and factors affecting an increased use of outsourcing in service companies.

The methods of the research include systematic and comparative analysis of the scientific literature gathered in Web Of Science, Taylor & Francis Online, Science Direct, Emerald Management eJournals Collection, SAGE data bases.

The paper proceeds as follows. A brief overview of theories concerning outsourcing and its groups is provided first to underline dominant theories. The next section of the article provides a theoretical context of existing literature of factors affecting outsourcing in different service companies operating in different service fields. Finally, an in-depth analysis is provided of the factors affecting the spread of outsourcing practice among service companies.

2. Theoretical basics on outsourcing

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

According to Busi, McIvor (2008), it is universally accepted that any phenomenon may be explained by various theoretical assumptions, based on relevant methods. Most scientific theories are used to express the attitudes of scientists towards the nature of the activities and functions of companies, as well as help them manage those processes in the right way (Vaxevanou, Konstantopoulos, 2015). The phenomenon of outsourcing is grounded in many scientific theories, which causes considerable confusion among scientists. Some of them are complementary, while others are contradictory (Perunovic, Pedersen, 2007).

In order to highlight the theories that underlie outsourcing of services, the classical and contemporary scientific theories of economics, management and service science were analysed. As mentioned before, the majority of authors focus on outsourcing in manufacturing and service companies. Dibbern et al. (2004) distinguish the following theories as the most important in the context of outsourcing: transaction cost theory (Coase 1937, Williamson 1975, 1981, 1985), resource-based view theory (Barney 1986, 1989, 1991), agency theory (Eisenhardt 1989, Jensen, Meckling 1976), social exchange theory (Blau 1964, Emerson 1972, Homans 1961), resource dependency theory (Pfeffer and Salanick 1978, Pfeffer 1984), strategic management theories: five forcers model (Porter, 1985) and adaptive cycle process model (Miles, Snow 1980), innovation diffusion theory (Roger 1962) , power and politics theory (Pfeffer 1981, 1982), relationship theory (Klepper 1995, Kern 1997), game theory (Nash 1953, Kreps et al. 1982, Spence 1976, Fudenberg and Tirole 1990).

Likewise, the abovementioned authors, Gottschalk, Solli-Saether (2006) distinguished classical theories such as neoclassical economic theory (Thorstein, 1900) and transaction cost theory, however, they also draw emphasis to the fact that trade, competencies and relationships are very important in a company, thus emphasising such theories as contract theory (Arrov, 1960), alliance theory (Lévi-Strauss, 1949), relationship exchange theory (Morgan, Hunt, 1994).

Busi and McIvor (2008) distinguished ten scientific theories which, according to the authors, most often explain the outsourcing phenomenon: transaction cost theory (Coase, 1937, Williamson, 1975, 1985), resource-based view theory (Penrose, 1959, Richardson, 1972), core competency theory (Prahalad, Hamel, 1990), evolutionary economics (Nelson, Winter, 1982; Mahnke, 2001), principal agent theory (Ross, 1973, Jensen, Meckling, 1976), vertical integration (Bain, 1968; Grossman, Hart, 1986), strategic management (Quinn, Hillmer, 1968), relationship market/view (Berry, 1983; Sommer, 2003), industrial economics (Porter, 1980), strategic alignment theory (Henderson, Venkatraman, 1990). Based on research of the authors, it should be noted that not only costs, but also company integration and strategic solutions are important for outsourcing development.

Based on Vaxevanou, Konstantopoulos, (2015), it may be argued that besides economic theory, cost theory and competency theory, researchers also referred to evolutionary economics theory (Nelson, Winter, 1982; Mahnke, 2001), relational view theory (Dyer, Singh, 1998), knowledge-based view theory (), economy of information theory (Stigler, 1961, Spence, 1973).

The views of different authors indicate that the achievements of various fields of science are used to assess the spread of outsourcing in companies, however, it is difficult to establish principles for the division of theoretical concepts. The growth of technological innovations encourages companies to expand the boundaries of activity and seek new business methods. Therefore, the article takes into account the theories and models that reveal the key areas of the company's decision to use outsourcing and allow identifying factors that determine the use of outsourcing. According to the authors of the article, three main groups of theoretical concepts may be distinguished: I – oriented towards improvement of company indicators and cost reduction; II – towards internal processes of a company, whilst managing resources, introducing innovation, increasing the competitive advantage between the companies operating in the same business and III – towards improvement of mutual relations with

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

existing partners and search for new ones, expanding cooperation and making decisions related to integration and merger with other companies (see Fig.1).

Although neoclassical economic theory is criticised for its inability to explain modern business operations, Gottschalk and Solli-Sæther (2005) have shown that neoclassical economic theory can be used to explain the success factors in the process of outsourcing. It should be noted that Transaction Cost Theory (TCE) is most widely used theory, and this theory as well as Resource-Based View (RBV) are indicated as the most significant theories for explaining the phenomenon of outsourcing.

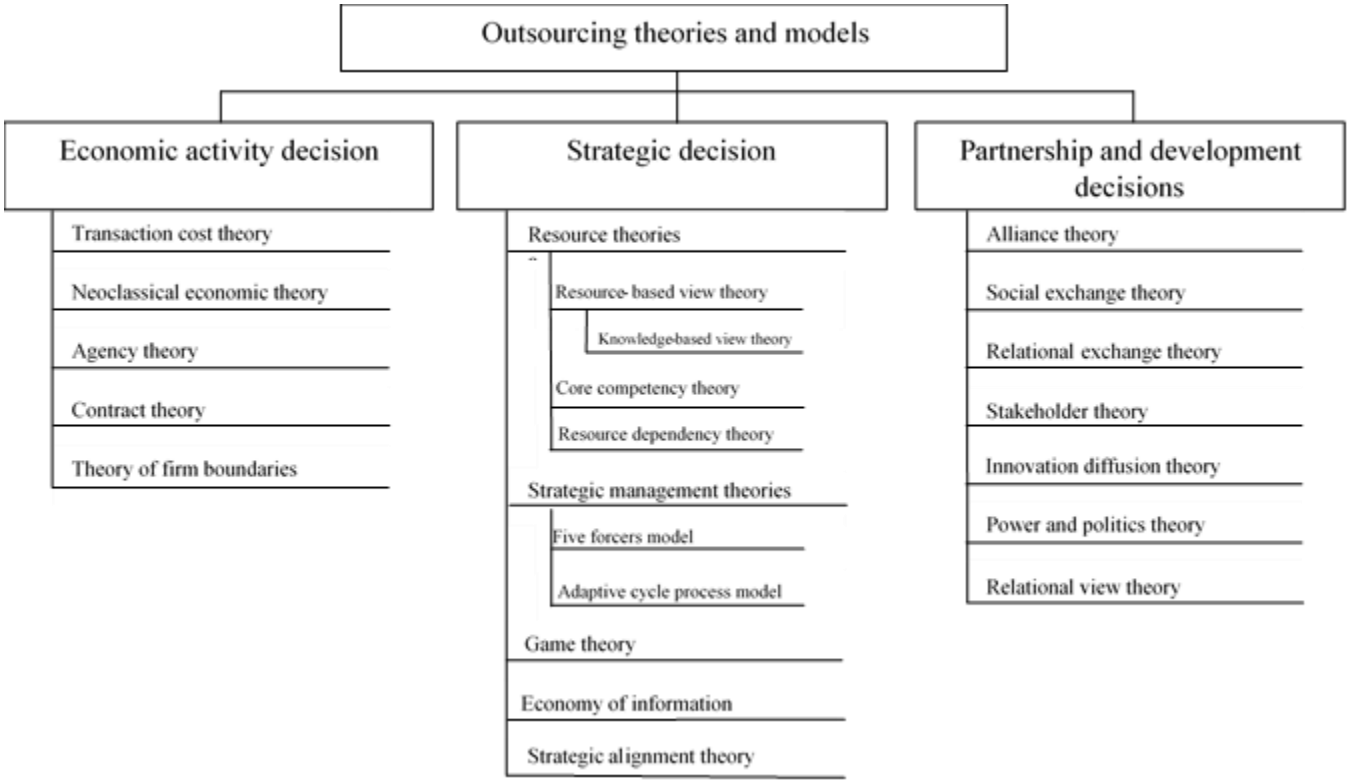


Fig. 1 Theoretical concepts of outsourcing
Source: authors

Both theoretic and practical studies focus on the topic of strategic management of companies. The figure shows that a broad spectrum of theories and models is associated with strategic decisions. Knowledge-based view theory discloses how knowledge is shared and what relationship is maintained with service providers in the process of outsourcing management. Core competency theory (Prahalad, Hamel, 1990) has evolved from resource-based view theory and reveals which key competencies and skills of an organisation it manages. According to Prahald and Hamel (1990), collective knowledge management and outsourcer competencies are key factors determining the success of outsourcing contract. Porter's (1985) five forcers model is beneficial for evaluation of outsourcing in companies providing services; adaptive cycle process model (Miles, Snow 1980), which reveals cyclic renewal of institutions, is also widely used.

Many researchers used game theory in their research (Nash 1953, Kreps et al., 1982, Spence 1976, Fudenberg and Tirole, 1990) to explain the strategic behaviour of players or participants (e.g. companies) in a particular situation where everyone works under the same conditions and seek to maximise their profits rationally and reasonably and

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

predict the actions of another player. Spence (1973), Stigler (1961) presented a model on the basis of economy of information theory, which sought to determine the scope and reliability of available information and how this information affects decision-making in an organization.

The third group theories focus on collaboration relations, relationships and development of companies that implement outsourcing. Agency theory presented by Jensen and Meckling (1976) evolved from assessment of the relationship between organisation's management and all stakeholders (agents) to the assessment of relationships between different organisations. The theory is used to analyse the stage of preparation when the organisation discusses all potential providers of outsources and decides which relationships to develop.

McIvor (2005) claims that Dyer, Singh's (1998) relational view theory may be used to explain how companies can gain and maintain competitive advantage in collaboration with other organisations. This theory is used for the studies of transitional period relationship management and is the only one that can be applied at all stages of the outsourcing process. According to McIvor (2005), relational theory provides explanations on how companies can gain and maintain a competitive advantage in their relationships with other organisations. Later studies by other researchers such as Yahnhong (2011), Saka, Vlacha, Nasiopoulos (2014) revealed that in order to develop a competitive advantage based on technology, the benefits of outsourcing are to be determined by the quality of the relationship at the time of concluding the contract and monitoring of the development of relationships between the contracting parties.

Klepper (1995), Kern (1997) argue that relationship theory helps in making an alliance and addressing the issues related to partnerships, competitive advantage, supply chain management, or supplier-buyer relationships.

According to Tushman's (1977) power and politics theory, which was used as a theoretical basis by Pfeffer (1981, 1982), Lacity and Hirschheim (1993), companies feel political power from a variety of institutions that control resources: access to information (for example, on the organization's activities, perks, etc.), which is why it affects decisions in outsourcings services.

Roger's (1962) innovation diffusion theory is considered one of the oldest social science theories. The basic principle of the theory is that during the process the focus is on target population groups and the factors that affect their decision-making. Therefore, this theory has been successfully applied in many areas, including communications, agriculture, science theories, public health, criminal law, social work and marketing.

3. Factors influencing implementation of outsourcing

Transformation in the global market is ongoing, therefore, companies reallocate resources by redirecting them to key operating sources in order to improve the quality of their business and gain advantage over competitors. According to Mickevičienė (2010), organisations apply different methods of management in solving the problem of the theory-practice relationship and in order to achieve the best results. Along with the traditional ways of organising business, new operational strategies are being developed to separate functions and, in some cases, outsource them to service providers specialising in the field. Changes related to crises and economic reforms were influential in local as well as international areas. Many countries moved their activities to other regions of the world. According to Kedia, Mukherjee (2009), some countries, such as India, Brazil, Russia, Hungary, Ireland and others have opened their markets. These countries have huge human capital resources which may be "lent". What is more, the authors emphasised that the development of outsourcing is influenced by globalisation, technological advancement, competition, economic reforms.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

Zhu et al (2001) claim that the need for outsourcing depends on four major changes taking place in a competitive market environment: continuous technological advancement, increasing risk and search for flexibility, focusing on company's specialisation, and globalisation. The development of information and communication in recent decades has had a great significance for the development of outsourcing. It has created opportunities for manufacturing and use of services in different locations, and has enabled the development of trade of services, as well as outsourcing (UNCTAD, 2004).

The scale of the spread of information and the changing economic structure encouraged the development of global and integrated operations. Multinational organisations have started to replace local companies. The advancement of information technologies changed business environment and companies aiming at cost reduction and increased availability of their services have started to invest in virtual offices at strategically convenient territories. Furthermore, trade liberalisation, reduction of international direct investment barriers and regulations in such fields as financial services, transportation, telecommunication and professional services between developed and developing countries reduced the costs of transportation and telecommunication and encouraged the growth of international network outsourcing. Increased competition and the fact that competitors use outsourcing to make their activities more effective stimulate the companies to practice outsourcing to minimise their costs, improve product quality and enable the company to effectively compete in an international market (Bahrami, 2009).

Scholars Lahiri, Kedia (2011) distinguished independent factors that influence the implementation of outsourcing. The above-mentioned factors are external: the lack of specialists with specific skills due to state policy, increasing costs related to business execution, development of information and communication technologies, increasingly intensive competition. The research conducted by Borodako et al., (2015) revealed the factors and their determinants that depend not on the organisation but rather on political, legal, economic, social and cultural environment.

Although the influence of service sector on economics is growing, research on outsourcing of different services is scarce. It was noted that a great part of scientific works iare dedicated to the analysis of outsourcing in manufacturing rather than service sector. Therefore, when systemising scholarly works on service sector, the point of view of the authors that categorise environmental factors, which influence the implementation of outsourcing and the goals of service companies, have been taken into account.

Lam, Han (2005) analysed hotel services and distinguished 9 factors, such as: reduction of cost, flexibility, pursuit of new technologies, pursuit of external knowledge and experience, added value for the image of service provider, optimisation of resources, increased income, entering new markets. Seeking to remain objective during their research, the authors asked the experts of hotel services to fill in the list of factors that encouraged them to outsource. Wan, Yen-Lun Su (2010) determined seven factors that are most frequently used in literature and, in order to remain accurate, used focus groups of hotel managers to check if the factors that they have selected are significant. The authors believe that reduction of costs, concentration on main company activities, flexibility, pursuit of new technologies, pursuit of external knowledge and experience, avoidance of capital investments and simplification of managerial work influence the implementation of outsourcing. Smuts et al. (2010) conducted research in communication service sector and distinguished eight factors encouraging the implementation of outsourcing: reduction of cost, flexibility, pursuit of new technologies, pursuit of external knowledge and experience, optimisation of resources, simplification of managerial work, improvement of money flows, reduction of the number of personnel. The research conducted by Lamminaki (2011) was based on scholarly theories and distinguished ten most significant factors, such as: reduction of costs, flexibility, specialisation of service provider, reduction or sharing of risk, example of competitors, avoidance of capital investment, opportunity for rapid establishment or expansion, management of volatility and unpredictability, unpredictable activities, broad scope of activities. When analysing bank services Jain, Natarjan (2011) concluded a list of outsourcing factors

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

which was discussed with experts including senior bank managers, scholars and outsourcing service providers. The key factors are the following: reduction of costs, concentration on main company activities, flexibility, quality improvement, pursuit of new technologies, pursuit of external knowledge and experience, reduction or sharing of risk, control of costs, pursuit to improve the effectiveness of activity, the replacement of fixed costs by variable costs, simplification of managerial work.

Table 1. The determinants of the outsourcing factors

Author, field of research	Factor determinants																										
	Reduction of costs	Flexibility	The pursuit of new technologies	The pursuit of external knowledge and	Risk reduction/sharing	Focus on key business activities of the	Service provider specialization	Quality improvement	Resource optimization	Simplification of management work	Cost control	Avoidance of capital investments	Enhancement of the competitive advantage	improvement of performance efficiency	Added value due to the image of the service	Implementation of the reduction strategy	Improvement of employee motivation	Creation of added value	Competitor example	Ability to quickly form and expand	Management of volatility and	Replacement of constant costs with floating	Broad scope of activities	Improvement of cash flows	Reduction of the number of employees	Increasing of income	Access to new markets
Borodako et al. (2015), organization of meetings	+	+	+	+	+	+	+	+			+		+	+			+	+									
Baytok et al. (2013), hotels	+	+	+		+	+	+	+	+				+		+	+											
Lamminaki (2011), hotels	+	+			+		+					+							+	+	+		+				
Jain, Natarjan (2011), banks	+	+	+	+	+	+		+		+	+			+								+					
Wan, Yen-Lun Su (2010), hotels	+	+		+		+	+			+		+															
Smuts et al. (2010), communication services	+	+	+	+					+	+														+	+		
Lam, Han (2005), hotels	+	+	+	+	+				+						+											+	+

Source: authors

The table shows that within the period of ten years the authors have usually analysed hotel services. However, irrespective of the services, all the authors determined that first of all, companies were encouraged to practice outsourcing by the reduction of costs and flexibility. Although researchers have analysed different services, 7-13 factors prevail and the total of 27 factors, which are classified as internal company factors, is provided in the matrix. The authors of this article believe that previously presented theoretical outsourcing concepts remain important when analysing and improving the results of service company activity as well as making decisions. Based on the foregoing, the link between the groups of the distinguished theoretical concepts and factors that influence the change of company activities can be observed. The first group consists of the factors which have been determined by conducting scholarly research and which are related to economic indicators: reduction of costs, flexibility, pursuit of new technologies, pursuit of knowledge and experience, reduction and sharing of risk. The factors in the second group are related to the main activity of the company and its management: concentration on main company activities, specialisation of service provider, quality improvement, optimisation of resources, simplification of managerial work. The third group includes such factors which have been distinguished only in the conducted research. Scientific works of other scholars on outsourcing of services were systemised in accordance with the researchers' point of view to external determinants and their components. Such researchers on service sector as Espino-Rodriguez, Ramirez-Fierro (2017), Ikediashi, Okwuashi (2015) Assaf et al., (2011), Gewald, Dibbern (2009) used all the factors determined in the research and attempted to systemise and group them accordingly (refer to Table 2). When analysing the aspects of outsourcing in bank sector with IT-related

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

services, Gewald, Dibbern (2009) emphasised eight factors that influence the implementation of outsourcing and grouped them into: cost-related, main activity-related, related to the need for specialised resources and improvement of quality.

Table 2. The purpose of outsourcing factors

Author, services	Factor groups	Purpose
Espino-Rodriguez, Ramirez-Fierro (2017) Hotel services	Tactical	*To work more efficiently, meet the need for staff that urgently occurred, reduce costs, increase profitability.*
	Strategic	*Management has more time to perform tasks, can better perform tasks, company employees can perform more tasks, the organization can concentrate on core activities, more works are completed with less effort, a possibility to have high qualification employees with a lot of experience presents, provides a possibility to have more time which is allocated for other jobs, provides a possibility to improve services.*
Ikediashi, Okwuashi (2015) Health care and social service	Economic	*To reduce costs, reduce capital investment, reduce costs for non-core activities, take advantage of the outsourcing provider cost effectiveness system, reduce costs by increasing performance.*
	Strategic	*To focus on key activities, improve strategic positions, increase flexibility, diversify resources, manage demand fluctuations more efficiently, compare internal results with others, play with privatization trend, share risk, and limit the number of employees.*
	Innovations	*To get access to new products and services, gain skills, experience and ideas, gain technology that is not available in the company, react faster to new needs.*
	Quality	*To improve productivity standards, improve service quality, and improve mutual trust with customers.*
	Temporal	*To improve timely provision of services. Lack of time to buy tools and equipment.*
	Social	*To increase shareholder satisfaction, improve customer relations, improve employment relations, improve social responsibility of the company (SRC), create jobs for the local community.*
Assaf et al. (2011) Educational services	Economic	*To reduce total costs, replace fixed costs with floating ones, improve cash flows, infusion of money, make capital funds more accessible to core activities, and increase economic effectiveness.*
	Strategic	*Focus on the core activities, acquiring of global capabilities, freeing of resources for the core activities, sharing the risk with the service provider, lack of internal resources, to improve the flexibility, adapt to dynamic market changes, strategic alliances with the service provider, regulations governing outsourcing practice.*
	Technological	*To gain flexibility with changing technologies, initiate innovative ideas and techniques, uncertainty of technology demand, the need for specific experience, the aim to acquire new skills or technological knowledge.*
	Quality	*To improve the quality of services, improve quality requirements, gaining of a competitive advantage by improving service quality, the improvement of trust and competence.*
	Management	*To save time intended for management, reduce management workload, the need for specialized management, increased implementation speed, functions with that are difficult to manage, consolidation and decentralization.*
	Functional Characteristics	*Complexity of functions, function integration and structure.*
Gewald, Dibbec (2009) Financial services	Costs	*Reduction of costs, optimizing of costs intended for performance-related programming, replacement of fixed costs with floating ones*
	Core activities	*Separation of the performance of non-core activities, redirection of management focus at the core activities, redirection of technical systems at core activities.*
	Specialized resources	*The pursuit of knowledge and skills of professionals, access to better IT systems.*
	Quality Improvement	*To improve process monitoring and improvement, to reduce the probability of malfunctions and errors.*

Source: authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

When analysing the application of outsourcing in universities Assaf et al. (2011) identified 38 factors that influence the application of outsourcing and divided them into the following groups: economic, strategic, technological, quality, management, and function characteristics. Strategic factors enable the organisation to receive greater benefits related to the long-term goals of the company. Management factors encompass all the factors that influence the results of service activities and management and are related to the stages of product creation, control and implementation. Economic factors are related to the generation of profit, since outsourcing enables organisations to create the services cheaper than their competitors. Technological factors concern the acquisition of skills, technology, processes and methods, while quality factors deal with the satisfaction of customers' needs and improvement of product quality. Function characteristics factors include functions that should be carried out externally (Assaf et al. 2011). In the later studies, the above-mentioned factor groups have been invoked by other researchers on service sector: Gbadegesin, Babatunde (2015) researched universities, Suweero, Moungnoi, Charoenngam (2017) studied commercial sector and building maintenance services. Scholars Suweero, Moungnoi, Charoenngam (2017) used six groups of outsourcing factors which have been described by Assaf et al. (2011) and added the factors that are specific to the building maintenance services, thus concluding a list consisting of 56 components.

Ikediashi, Okwuashi (2015), who studied patient services in healthcare system, concluded a list of 65 components that influence the implementation outsourcing and divided them into eight groups: cost/economic, strategic, innovation, income, quality, time, social, other. Having conducted a pilot test in hospitals, the scholars shortened the list to 31 components and divided them into 5 groups: cost/economic, strategic, innovation, quality, time and social.

When conducting their research related to outsourcing in hotels and having analysed the works of other scholars as well as outsourcing factors used in prior empirical researches, Espino-Rodriguez, Ramirez-Fierro (2017) distinguished two groups, i.e. tactical and strategic, which consist of 12 factors.

Table 2 provides the goals that hotels, healthcare and social service, education and finance service companies pursue by practicing outsourcing. The data show that different services and their characteristics determined different factor groups and company goals. It should be noted that in the majority of cases the service providers related to the public wellbeing and the improvement of people's quality of life, such as healthcare, social service and education service providers aim at improving their activities. The majority of goals of such services coincide and are economic, strategic, innovation and quality, which are oriented towards the decision-making levels of service companies and related to the improvement of activities. The authors' research results show that the goals of all service companies include internal factors and only education companies aim at their development and reaching of goals, which are oriented towards external environment and are related to the integration of functions, adaptation to the changing market and acquisition of international capacity.

The empirical research carried out by other scholars can be categorised based on Assaf et al. (2011) methodology (Table 3), thus revealing the most significant factors that influence outsourcing. It can be observed that the most significant groups among service companies are strategic and economic factor groups. However, the claim of Arias-Aranda et al. (2010) that outsourcing should be viewed as a means of flexibility, the benefit of which is seen in the long term, rather than the means of cost reduction, whose benefit is observed in the short term, is to be taken into account.

Table 3. The components of factors that influence the implementation of outsourcing on services

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(21)

Author, field of research	Factors				
	Economic	Strategic	Technological	Quality	Management
Espino-Rodriguez, Ramirez-Fierro (2017), hotels	Cost reduction, increase of profitability	Efficiency, unexpected need of personnel			
Borodako et al,. (2015), organizers of business meetings		Efficiency, flexibility		Quality improvement	
Ikediashi, Okwuashi (2015), hospitals				Improving of performance standards and service quality	Ensurance of a timely service provision
Yildiz, Damire (2014), hotels	Reduction of general and employee-related costs	Investment risk reduction and flexibility			
Sani A. et al. (2013), hotels	Reduction of operational costs	Internal resource optimization, Reputation of outsourcing provider	Experience of outsourcing provider		
Baytok et al. (2013), hotels	Reduction of costs		The pursuit of new technologies, service provider specialization	Quality improvement	
Lamminaki (2011), hotels	Reduction of costs, avoiding of capital investments	Flexibility, ability to quickly form and expand			
Assaf et al. (2011), educational services		Risk Sharing		Improvement of quality requirements	Reduction of implementation time
Jain, Natarjan (2011), banks		Importance of core competencies	Access to new skills and new technologies	Focus on customer service	
Smuts et al. (2010), communication services	Reduction of costs	Flexibility, better resource compatibility with the needs	Better access / to more resources		
Gewald, Dibbern (2009), banks	Cost optimization			Process monitoring and improvement, error reduction	Improvement of the management of core activities
Lam, Han (2005), hotels	Cost reduction, increase of income	Risk reduction, resource optimization			

Source: authors

Sani et al. (2013) applied outsourcing models of hotel services and complemented this point of view by claiming that outsourcing allows improving the quality of outsourced activities, as they are carried out by companies specialising in specific activities, while hotels are able to concentrate on their main activities thus improving their quality. The table shows that the majority of empirical researches have been conducted in hotels, which is determined by the fact that the scope of tourism-related services is growing. An important position of the researched fields is assumed by the service quality, prompted not only by an increasing amount of attention to customers, but also by service quality requirements. Scientific research revealed that economic and strategic factors dominated among the most significant factors encouraging outsourcing in service companies.

The analysis showed that the development of outsourcing is affected by both environmental changes that are independent from the organisation and internal decisions related to the activity of the organisation and its improvement. When analysing scholarly research, it can be observed that scholars analyse the internal factors that influence the development of outsourcing in two ways: by emphasising the factors that are most frequently found in the literature and by attempting to encompass all the factors that were found and dividing them into separate groups. Since scholarly literature does not exclude the factors that are specific to outsourcing in service companies, researches conducted in separate service company groups have been analysed. Having conducted this analysis, the conclusion has been reached that strategic and economic factors influence the development of outsourcing of services the most.

Conclusions

The change and development of outsourcing has been defined in scholarly literature by employing a variety of scientific theories, which aim at finding the basis of outsourcing and its development factors. Provided theories were divided into three groups: theories related to economic and cost reduction decisions of the companies, theories related to strategic management and theories related to collaboration and development decisions. Transaction cost theory, resource-based view theory, research dependency theory and the theories belonging to the third group can be considered the most significant and applicable theories in the context of the future researches on outsourcing. It is noteworthy that the significance of the third theory group is increasing as transaction cost theory, resource-based view theory and research dependency theory are used as a basis of outsourcing, however, the latest research shows that outsourcing has underwent development and transformation (related to restructuring and partnership). Therefore, the third theory group serves as a basis of outsourcing development factors at certain levels of collaboration. Theoretical concepts related to the expectations of service providers and receivers, change of service quality and use, will continue to be modelled and verified alongside classical innovation diffusion theory.

Although service sector researches emphasise that cost reduction should not be considered the key reason of outsourcing, while based on the results of empirical researches economic factors prevail, we believe that the scope of outsourcing will increase, while the service quality parameters will become the most important when expanding the activities of companies and striving for competitive advantage.

The benefit and growth of service outsourcing is unquestioned. Although the determined groups of outsourcing factors are sufficiently clear, a varying and large number of components (up to 65) burdens the identification of general and specific tendencies of outsourcing development. Furthermore, assessment and comparison of outsourcing among different countries and regions is not possible due to the limited spread of empirical researches (covering only a few service groups according to the WTO) and its results. Therefore, further research in this direction would be useful.

References

Alajaasko P. 2006. The demand for services: external but local provision, *Statistics in focus: industry, trade and services*, 26: 1-8. http://ec.europa.eu/eurostat/documents/3433488/5443985/KS-NP-06-026-EN.PDF/5bbca935-d765-42b4-9533-edc36bcccee7?version=1.0

Arias-Arand D., Bustinza O.F., Barrales-Molina V. (2011). Operations flexibility and outsourcing benefits: an empirical study in service firms, *The service industries journal*, Vol. 31, No. 11, 1849-1867. https://doi.org/10.1080/02642069.2010.503880

Assaf S. et al. 2011. Factors affecting outsourcing decisions of maintenance services in Saudi Arabian universities, *Property management*, Vol. 29, No. 2, 195-212. https://doi.org/10.1108/02637471111122471

Aubert B. A., Rivard S., Patry M. 1996. A transaction cost approach to outsourcing behavior: Some empirical evidence, *Information & Management*, Vol. 30, No.2, 51-64. https://doi.org/10.1016/0378-7206(95)00045-3

Bahrami B. 2009. A look at outsoutcing offshore, *Competitivess Rewiev: An International business Journal*, Vol. 19, No. 3, 212-223. https://doi.org/10.1108/10595420910962089

Baytok et al. 2013. Outsourcing in Thermal Hotel Enterprises: The Case of Turkey, *Business Management Dynamics*, Vol.3, No.5, 01-14. http://bmdynamics.com/issue_pdf/bmd110425-%2001-14.pdf

Blumberg D. F. 1998. Strategic assessment of outsourcing and downsizing in the service market, *Managing service quality*, Vol. 8., No 1., 5-18. https://doi.org/10.1108/09604529810199340

Borodako et al. 2015. External and Internal Factors Motivating Outsourcing of Business Services by Meeting-Industry Companies: A Case Study in Krakow, Poland, *Journal of Convention & Event Tourism*, 16:93–115. https://doi.org/10.1080/15470148.2015.1013170

Busi M., McIvor R. 2008. Setting the outsourcing research agenda:the top-10 most ugent outsourcing areas, *Strategic outsourcing: An international journal*, Vol.1, No. 3, 185-197. https://doi.org/10.1108/17538290810915263

Dibbern J., Hirschheim R. 2004. Information systems outsourcing: A survey and analysis of the literature. *Data Base for Advances in Information Systems*, Vol. 35, No. 4, 6-102.
https://www.researchgate.net/publication/220627990_Information_systems_outsourcing_A_survey_and_analysis_of_the_literature

Espino-Rodríguez T. F., Ramírez-Fierro J.C. 2017. Factors determining hotel activity outsourcing. An approach based on competitive advantage. *International Journal of Contemporary Hospitality Management*, Vol. 29 Issue: 8, 2006-2026. https://doi.org/10.1108/IJCHM-05-2016-0291

Franchesi F. et al. 2003. Outsourcing: guidelines for a structured approach, *Benchmarking: An international journal*, Vol. 10, No. 3, 246-260. https://doi.org/10.1108/14635770310477771

Fuschi, D. L.: Tvaronavičienė, M. 2016. A network based business partnership model for SMEs management, *Entrepreneurship and Sustainability Issues* 3(3): 282-289. https://doi.org/10.9770/jesi.2016.3.3(5)

Gbadegesin J. T., Babatunde T. O. 2015. Investigating expert‘s opinion on outsourcing decision in facilities management practice in public univercities in Nigeria. *Journal of facilities management*, Vol. 13, No.1, 27-41.

Gerbl M., McIvor R., Humphrey 2009. Global services outsourcing: Critical aspects and future directions. *POMS 20th Annual Conference*, 1-23. *https://pomsmeetings.org/ConfProceedings/011/FullPapers/011-0518.pdf*

Gewald H., Dibbern J. 2009. Risks and benefits of business process outsourcing: A study of transaction services in the German banking industry. *Information & Management*, 46, 249–257. https://doi.org/10.1016/j.im.2009.03.002

Gomez J. F. et al. 2009. Outsourcing maintanance in service providers, *Taylor &Francis group,*, 829-837. https://pdfs.semanticscholar.org/d73f/8b4a2f653acf96aa3dab9015be1e0ea7688b.pdf

Gottschalk, P., Solli-Sæther H. 2006. Maturity model for IT outsourcing relationships, *Industrial Management and Data Systems*, 106 (2), 200–212. https://doi.org/10.1108/02635570610649853

Ikediashi D., Okwuasi O. 2015. Significant factors influencing outsourcing decision for facilities management (FM) services: A study of Nigeria‘s public hospitals. *Property management*, Vol. 33 Iss1, 59-82. https://doi.org/10.1108/PM-04-2014-0018

Yi S., Guo K., Chen Z. 2016. Forecasting China‘s service outsourcing development with an EMD-VAR-SVR ensemble method. *Procedia computer science*, 91, 392-401. https://doi.org/10.1016/j.procs.2016.07.101

Jain R.K., Natarjan R. 2011. Factors influencing the outsourcing decisions: a study of the banking sector in India, *Strategic Outsourcing: An International Journal*, Vol. 4 No. 3, 294-322. https://doi.org/10.1108/17538291111185485

Kishore R. et al. A. 2003. A relationship perspective on IT outsouring, *Communications of the ACM*, Vol.46, No.12, 86-92. https://www.researchgate.net/publication/234779357_A_relationship_perspective_on_IT_outsourcing

Kedia B.L., Lahiri S. 2011. Co-evolution of institutional and organizational factors in explaining offshore outsourcing, *International business review*, 20, 252-263. https://doi.org/10.1016/j.ibusrev.2011.01.005

Kedia B.L., Mukherjee D. 2009. Understanding offshoring: A research framework based on disintegration, location, and externalization advantages, *Journal of World Business*, 44, 250-261. https://doi.org/10.1016/j.jwb.2008.08.005

Koszewska M. 2004. Outsourcing as a modern management strategy. Prospects for its development in the prospective clothing market, *Autex Research magazifoone*, Vol. 4, No.4, 228-231. http://www.autexrj.com/cms/zalaczone_pliki/8-04-4.pdf

Kremic T., Tukel O. I., Rom W. O. 2006. Outsourcing decision support: a survey of benefits, risks and decision factors, *Supply chain management: An international journal*, 11/6, 467-482. https://doi.org/10.1108/13598540610703864

Lankford W. M., Parsa F. (1999). Outsourcing: a prime, *Management decision*, 37/4, 310-316.

Lam T., Han M.X.J. 2005. A study of outsourcing strategy: a case involving the hotel industry in Shanghai, China. *Hospitality Management*, Vol. 24, 41–56. https://doi.org/10.1016/j.ijhm.2004.04.002

Lamminmaki D. 2011. An examination of factors motivating hotel outsourcing. *International Journal of Hospitality Management*, 30, 963-973. https://doi.org/10.1016/j.ijhm.2010.10.010

Mclvor R. (2005). *The Outsourcing Process – Strategies for Evaluation and Management.* - UK: Cambridge University Press, 224.

Mickeviciene M. *Įmonės gebėjimo konkuruoti tyrimo metodolog*ija. Daktaro disertacija, KTU, Kaunas 2010

Michael L. Tushman M.L. 1977. A Political Approach to Organizations: A Review and Rationale, *The Academy of Management Review* Vol. 2, No. 2, 206-216. https://www.jstor.org/stable/257904?seq=1#page_scan_tab_contents

Pauceanu, A. M. 2016. Innovation and entrepreneurship in Sultanate of Oman – an empirical study, *Entrepreneurship and Sustainability Issues* 4(1): 83-99. https://www.researchgate.net/publication/286449154_Innovation_and_entrepreneurship_in_Sultanate_of_Oman_-_an_empirical_study

Perunovic Z., Pedersen J.L. 2007. Outsourcing Process and Theories, *POMS 18th Annual Conference Dallas, Texas, U.S.A.*, https://www.researchgate.net/publication/252405855_Outsourcing_Process_and_Theories

Rogers, E. M. (1962). *Diffusion of innovations*. First edition. New York. Free Press. ISBN 0612628434.

Sakas, D., Kutsikos, K. 2013. An Adaptable Decision Making Model for Sustainable Enterprise Interoperability, *2nd International Conference on Strategic Innovative Marketing*. https://doi.org/10.1016/j.sbspro.2014.07.087

Sani A., Dezdar S., Ainin S. 2013. Outsourcing patterns among Malaisian hotels, *International juornal of business and social science*, Vol.4, No. 9.,113-114. http://www.ijbssnet.com/journals/Vol_4_No_9_August_2013/13.pdf

Smuts H. et al. (2010). Information systems outsourcing issues in the communication technology sector. *IADIS International Conference Information Systems*, 145-155. http://hdl.handle.net/10204/4160

Suweero K., Moungnoi W., Charoenngam Ch. 2017. Outsourcing decision factors of building operation and maintenance services in the commercial sector, *Property Management*, Vol. 35 Issue: 3, 254-274. https://doi.org/10.1108/PM-06-2016-0028

Tushman M.L.1977. A Political Approach to Organizations: A Review and Rationale. *The Academy of Management Review* Vol. 2, No. 2, 206-216. http://www.jstor.org/stable/257904

Vaxevanou A., Konstantopouls N. 2015. Models referring to outsourcing theory. *Procedia - Social and Behavioral Sciences*, Vol. 175, 572 – 578. https://doi.org/10.1016/j.sbspro.2015.01.1239

Wan C-S., Yen-Lun Su A. 2010. Exploring the Factors Affecting Hotel Outsourcing in Taiwan, *Asia Pacific Journal of Tourism Research*, Vol. 15, No. 1., 95-107. https://doi.org/10.1080/10941660903510099

Yanhong W. 2011. A Framework of Business Process Outsourcing Relationship Evolution Model, *Management Science and Industrial Engineering (MSIE), International Conference*. 10.1109/MSIE.2011.5707581

Yildiz S., Damire Z. H. 2014. The benefits, risks and effects on performance of the outsourcing: A comparative study of seasonal and permanent hotels. *Procedia – Social and Behavioral Science*, Vol. 109, 514-521. https://doi.org/10.1016/j.sbspro.2013.12.499

Zhu Z., Hsu K., Liulie J. 2001. Outsourcing – a strategic move: the process and the ingredients for success, *Managing decision*, 39/5, 373-378. https://doi.org/10.1108/EUM0000000005473

World investment report:the shift toward services//United Nations Commission on Trade and Development 2004 http://unctad.org/en/docs/wir2004_en.pdf

The role of the services economy and trade in structural transformation and inclusive development // Trade and Development Board Trade and Development Commission Multi-year Expert Meeting on Trade, Services and Development Fifth session Geneva, 18–20 July 2017 Item 3 of the provisional agenda http://unctad.org/meetings/en/SessionalDocuments/c1mem4d14_en.pdf

Rima ZITKIENE is the Professor of Social Sciences (Management) at Mykolas Romeris University, Economics and Business Faculty, Lithuania. She has published over 60 articles in Lithuanian and foreign scientific journals, monographs, research studies and textbooks. Since 2007 she is expert on the database of humanities and social sciences of the Lithuanian Academy of Sciences "Lituanistika"; since 2010 expert of EDAMBA ('European Doctoral programs Association in Management & Business Administration) and EIASM (European Institute for Advanced Studies in Management); member of ERA (European Retail Academy); since 2010 a member of Doctoral Committee studies in Management Science (Consortium - Vytautas Magnus University together with Lithuanian University of Agriculture, Klaipeda University, Mykolas Romeris University, Siauliai University). Her research interests are in a field of retailing, service and business management.
ORCHID ID: https://orcid.org/0000-0002-0954-7251

Ugne DUDE Phd candidate of Management Sciences**.** Research interests: business management, outsourcing, marketing, international trade, services.
ORCID ID: https://orcid.org/0000-0002-6319-7045

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Publisher
http://jssidoi.org/esc/home

STUDENT SATISFACTION AND PERCEIVED SKILLS: ANY LINK TO EMPLOYABILITY?*

Ovidiu Niculae Bordean[1], Adrian Sonea[2]

[1] *Babeş-Bolyai University of Cluj-Napoca, Faculty of Economics and Business Administration, 58-60 Theodor Mihali Street, 400591, Cluj-Napoca, Romania*
[2] *Petru Maior University of Târgu-Mureş, Faculty of Economics, Law and Administration, 69 Livezeni Street, 540566, Târgu-Mureş, Romania*

E-mails:[1] ovidiu.bordean@econ.ubbcluj.ro; [2]adrian.sonea@ea.upm.ro

Received 17 May 2018; accepted 20 July 2018; published 30 September 2018

Abstract. The present study aims to determine the perceived satisfaction of students enrolled in a tourism undergraduate program and to assess the impact perceived skills have on their intentions regarding future careers. This is a quantitative study based on the analysis of primary data gathered through a questionnaire. A sample of 114 students in their second year of study from the biggest university in Romania completed the questionnaire. The data collected were analysed using descriptive analysis, ANOVA and regression analysis. An ANOVA test and post hoc Tukey test were therefore used to determine differences in the means and variance of satisfaction, with the grade levels and course attendance set as the independent variables. A regression analysis was then conducted to identify the connections between perceived skills and the future career path of tourism students. The results show that students do not perceive satisfaction differently according to their grade levels, although there may be a relationship between levels of satisfaction and class attendance. Optimism was found to predict whether students would be interested in starting a business, while attitudes towards leadership and networking were found to predict whether students wished to pursue a management career.

* *This work was supported by the strategic grant "Integrated system for improving the doctoral and postdoctoral research quality in Romania and for promoting the role of science in society", POSDRU/159/1.5/S/133652, co-funded by the European Social Fund through the Sectoral Operational Programme Human Resources Development 2007-2013.*

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Keywords: higher education programs, student satisfaction, knowledge and skills, employability.

Reference to this paper should be made as follows: Bordean, O. N.; Sonea, A. 2018. Student satisfaction and perceived skills: any link to employability? *Entrepreneurship and Sustainability Issues* 6(1): 356-370. http://doi.org/10.9770/jesi.2018.6.1(22)

JEL Classifications: I23, I25, M13, M53

1. Introduction

Regardless of the specific sector of the tourism industry in which they work, managers should pay careful attention to the selection and retention of good personnel. Previous studies have shown that, in different sectors of the tourism industry, the successful recruitment and retention of high quality human resources is a critical driver for the sustainability of the business (Lockyer and Scholarios, 2004; Martin, Mactaggart, and Bowden, 2006). Consequently, many university tourism programs have developed their own career and placement services to assist students when searching for jobs. Moreover, there are several tourism companies that invest in university graduate recruitment, training and development (Doherty, Guerrier, Jameson, Lashley, and Lockwood, 2001).
Chi and Gursoy (2009) argue that, for tourism students who want to work within the tourism industry, it is essential to adopt pro-active approach, such as becoming involved in diverse internship projects, taking more course work, developing network skills, and participating in extracurricular activities such as tourism student clubs/societies, fund-raising initiatives, and involvement with the local community.

Given these requirements, it is unsurprising that university tourism curricula are not sufficiently able to ensure the successful retention of students within this industry. Furthermore, an investigation into students' satisfaction towards courses, laboratories and internship projects may help to explain their personal aptitude for pursuing a career within the tourism industry.

However, research studies that explore students' satisfaction with academic and university life are scarce (Borden and Owens, 2001). A clear understanding of students' satisfaction is a good indicator of quality assurance in the higher education system. This study will contribute a new perspective to the complex relationship between satisfaction and students' knowledge and skills, and the relationship between these and students' subsequent integration into the tourism industry.

The present study therefore aims to identify the factors that increase students' level of satisfaction with academic and advisor experiences, campus facilities, courses and laboratories, and internship programs. At the same time, it will also identify whether there is any link between the perceived knowledge and skills of tourism graduate students and their future career paths. The following research questions therefore define the study:

- To what extend do tourism students feel satisfied with resources such as academic experience, campus facilities, internship opportunities, and academic advisors?
- Do satisfaction levels differ according to level of grades or class attendance?
- Does the students' perceived knowledge and skills predict the career path they will follow post-graduation?

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

2. Literature review

2.1 Student satisfaction

For many reasons (e.g. increased competition in the educational market, demographic changes, increased education costs), universities are increasingly focused on meeting or even exceeding the needs of their students (DeShields, Kara, and Kaynak, 2005). The stakeholder theory may therefore be useful in explaining the approach universities take when addressing students' satisfaction issues. Finney and Finney (2010) define this approach as the students-as-customer (SAC) model of higher education. According to this model, students are seen as important stakeholders of universities which has both positive and negative consequences. On the one hand, universities will do their best to meet students' expectations as their staff will schedule classes at times that are convenient for students, schedule courses frequently to meet student demand, and offer a sufficient variety of course topics (Stafford, 1994). Moreover, it is likely there will be an increase in the number of prompt responses to students' questions and increased accessibility of staff. On the other hand, some critics argue this approach subverts academic rigor to meet students' desires, promotes grade inflation and reduces student responsibility (Franz, 1998; Hassel and Lourey, 2005).

However, quality and satisfaction are perceived as fundamentally different concepts (Gruber, Fuß, Voss, and Glaser-Zikuda, 2010), and several attempts to establish connections between the two are evident within the research literature. Thus far, there are divergent views regarding the sequential order of the two constructs. Some scholars (e.g., Cronin, Brady, and Hult, 2000; Farrell, Souchon, and Durden, 2001; Dalati and Al Hamwi, 2016) view perceived quality as an antecedent to satisfaction, whereas others (e.g., Parasuraman, Zeithaml, and Berry, 1998) consider customer satisfaction to be an antecedent to service quality. In the literature on higher education, Browne, Kaldenberg, Browne, and Brown (1998), and Guolla (1999) found that perceived quality of service among students is an antecedent to student satisfaction.

> *Student satisfaction is defined as "the favourability of a student's subjective evaluation of the various outcomes and experiences associated with education. Student satisfaction is being shaped continually by repeated experiences in campus life" (Elliott and Shin, 2002, p. 198).*

Elliot and Shin (2002), citing the student satisfaction inventory developed by Noel-Levitz, identified the following dimensions of perceived importance and satisfaction: effectiveness of academic advice; campus climate; campus life; campus support services; concern for the individual; instructional effectiveness; effectiveness of recruitment and financial aid; effectiveness of registration; campus safety and security; service excellence; student centeredness.

Over the last few decades, many studies have attempted to establish why some students are more satisfied than others. Although there have been many attempts to identify the determinants of student satisfaction, Aldridge and Rowley (1998) divide them into two broad categories: (1) factors associated with teaching and learning, and (2) factors associated with the overall student experience. Initially, researchers were interested in the first category of factors (Browne *et al*., 1998; Franklin and Knight, 1995); however, more recently there has been increasing interest in the totality of the student experience (Brown and Mazzarol, 2009; Delaney, 2005; Kuh and Hu, 2001). This change in paradigm is due to the fact that teaching and learning cannot be separated from all the other services and experiences the student encounters. Moreover, knowing and understanding all the elements that may have an influence on student satisfaction creates a valuable resource for future management interventions.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

2.2 Knowledge, skills and carrer paths

From a historical point of view, it is possible to identify two distinct periods within the career management literature. Traditionally, companies provided tremendous support for personal career development plans as they provided graduates with steady employment. Thus, graduates were extremely motivated to pursue long-term career goals and achieve these companies that employed them (Noe, 1996). However, career development is now considered the responsibility of the individual, rather than the company (Kanter, 1989). In such circumstances, it is extremely important that students do their upmost to enhance their skills, work experience and their ability to handle projects if they are to remain employable (Hall and Mirvis, 1995). Consequently, there is now a shift from organizational career management to career self-management (Adamson, Doherty, and Viney, 1998). This has led to more individualism in careers and to the proliferation of a protean career that places responsibility on the individual. Another significant change in terms of career management is that of increased mobility and a shorter stay within a certain company (Baruch, 2004; McCabe, 2001).

For these reasons, scholars have debated the issue of career exploration in terms of whether this is best pursued through both self-exploration and environmental exploration (Flum and Blustein, 2000). In the former, the individual will explore his or her own values and experiences to enable them to identify an appropriate career. Conversely, environmental exploration involves collecting information on jobs, organizations and industries to provide the individual with enough information to make the best career decision (Zikic and Richardson, 2007).

This paper addresses the issue of career management skills in terms of those skills that are essential in finding proper employment and further educational opportunities whilst building a career (Bridgstock, 2009). Over the last few years, career paths have been a common research topic within career management in the tourism industry, along with career choice, career commitment and career success (Kong, Cheung, and Zhang, 2010). Special attention has been paid to the hotel sector as previous studies have shown managerial skills to be the most important element for a career in hotel management (Ladkin, 2002). Table 1 highlights the main factors that shape the career path, as identified in literature on the tourism industry. The research undertaken within this field has established an intrinsic connection between the level of skills and knowledge managers have and their career paths.

Several scholars have investigated tourism students' perceptions of their future career path in different contexts. For example, Kusluvan and Kusluvan (2000) investigated undergraduate tourism students' attitudes towards different aspects of working in the tourism industry. Their sample comprised 397 third and fourth year students from seven publicly owned tourism and hotel management schools in Turkey. The survey findings showed that there were negative attitudes towards several aspects of work conditions, such as pay/benefits, physical working conditions and promotion opportunities.

Table 1. Antecedents of career paths in tourism industry

Authors	**Antecedents of career paths in tourism industry**
Ladkin and Riley (1996)	Job mobility
Ladkin and Juwaheer (2000)	Skills needed
Harper *et al*. (2005)	Educational background
Ladkin (2002)	Length of time to become a general manager
Nebel *et al*. (1995)	The importance of specific jobs to career development
Ayres (2006)	Opportunities provided by the industry Education and training

Source: created by authors based on literature review

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Lewis and Airey (2001) conducted research with 120 secondary school students to explore their attitudes towards careers in tourism. The results showed that work values and sources of information influence attitudes towards tourism employment, as students who have an interest in self-development and work with friendly people admit that tourism can provide good career opportunities.

Barron, Maxwell, Broadbridge, and Ogden (2007) conducted qualitative research consisting of focus group discussions with third and fourth year tourism students in the UK. Their aim was to explore the issues students regarded as pertinent to their expectations of a future career the in tourism industry. The findings revealed both positive and negative aspects related to the tourism industry. The students who took part in the survey highlighted its enjoyable nature, the perceived career opportunities, and their interesting experiences within this sector. The negative factors experienced by students included poor levels of pay and unsociable working hours.

3. Research methodology

3.1 Instrument and procedures

The research was conducted at Babeș-Bolyai University in Cluj-Napoca and the sample comprised students who enrolled on the Geography of Tourism specialization in their second year of study. The data was collected during the middle of the second term of the 2012/2013 academic year (April-May). It was felt that if students were questioned during the exam sessions they would be busy, and this would probably have a negative impact on their satisfaction levels. The questionnaires were therefore administered during a Tourism Management class which was very convenient for students. The paper version of the questionnaire was used rather than the on-line version as previous studies found there to be a lower response rate when on-line questionnaires were used (Douglas and Douglas, 2006).

The questionnaire was designed to measure tourism students' satisfaction with the university and the perceived skills and knowledge needed to succeed in the tourism industry. The questionnaire comprised several parts. To measure satisfaction, students were asked to respond to ten statements using a five-point Likert scale (1 – very unsatisfied, 5 – totally satisfied). The ten dimensions of satisfaction that were measured were: (1) quality of courses; (2) quality of seminars/laboratories; (3) elective courses; (4) internship; (5) professors' willingness to answer their questions; (6) internship coordinator's answers to their questions; (7) the grades awarded for exams; (8) the grades awarded for projects; (9) faculty facilities (laboratories, library resources, dormitories, cafeteria, etc), and (10) the specialization taken.

The second section of the questionnaire concerned the perceived knowledge and skills needed to manage a business in the tourism industry. The students were asked to state their opinion on several skills using a five-point Likert scale (1 – Highly unimportant, 5 – Highly important). This dimension comprises the following skills: leadership skills, risk-taking, task delegation, ability to make decisions, ability to create a network of relations, and optimism.

The students were then asked about their future career path in the tourism industry and were given two options: starting as entrepreneurs or following a management career. They were asked to state the probability of following one of these two career paths using a five- point Likert scale (where 1 = very improbably, 5 = most probably). Other questions included in the survey assessed their engagement with academic life and measured their grade levels and class attendance. Finally, the questionnaire included several demographic questions regarding their age, gender and income level.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

3.2 Research sample

The Geography of Tourism specialization is designed for students who want to adopt a multidisciplinary approach as they will study tourism from both a social and an economic perspective. Students enrolled on the Geography of Tourism specialization must undertake an internship at different tourist facilities, for example, tourism agencies, hotels, pensions, and so on. A total of 114 students in their second year of study completed the questionnaire. The response rate was 41.07 %. In terms of gender distribution, 60 percent were female and 40 percent were male, a distribution similar to that in previous studies (Gruber *et al*., 2010). The average age of respondents was 21.44 years with a standard deviation of 2.442. Table 2 presents selected demographic characteristics of the sample.

3.3 Data analysis

The research questions were addressed using several statistical analyses. The data gathered during the survey was coded and analysed using SPSS 16.0. The first analysis that was employed was Cronbach's alpha reliability coefficient that measured the internal consistency of questionnaire items relating to *satisfaction levels* and *perceived skills.* Nunnally (1978) defined values over 0.75 as sufficient; however, Tavakol and Dennick (2011) argued that a high value of alpha (*>0.90*) may suggest redundancies and therefore the test length should be shortened. Our findings were highly positive for both sets of variables. For satisfaction the value of Cronbach's alpha was 0.80, whereas for perceived skills the value was 0.78. These results add validity and accuracy to the interpretation of the data.

Table 2. Demographic characteristics of the sample

Demographic characteristics		**N**	**Percentage**
Gender	Male	45	39.47
	Female	69	60.53
Age distribution	20-21	87	76.32
	22-23	14	12.28
	24-25	7	6.14
	26-35	6	5.26
Respondent distribution according to their grades	Between 5 and 6	3	2.60
	Between 6.01 and 7	17	14.90
	Between 7.01 and 8	48	42.10
	Between 8.01 and 9	30	26.30
	Between 9.01 and 10	16	14.00
Respondents distribution according to class attendance	One class per week	5	4.39
	Two classes per week	9	7.89
	Three classes per week	42	36.84
	Four or more classes per week	58	50.88

Source: authors' own calculations based on data gathered

Another analysis was conducted to identify the level of satisfaction among tourism students and their perceptions regarding the skills needed in the tourism industry. An ANOVA test and post hoc Tukey test were therefore used to determine differences in the means and variance of satisfaction, with the grade levels and course attendance set as the independent variables. A regression analysis was then conducted to identify the connections between perceived skills and the future career path of tourism students.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

4. Results of research

An ANOVA test was conducted to identify any significant differences between the independent variables (level of grades and class attendance) and the dependent variables (the ten items related to tourism students' satisfaction). During the survey, tourism students answered questions related to the grades they obtained and the frequency of class attendance. Five groups of respondents were formed based on their levels of grades and four groups were formed based on their class attendance. Table 3 contains the results of the ANOVA test.
The results show there was a significant difference between the groups of students with different levels of grades in terms of their satisfaction towards their grades ($F_{(4-108)}=3.299$, $p=0.014$). There was also a significant difference between the groups of students regarding their attendance, their satisfaction regarding elective courses ($F_{(3-108)}=3.329$, $p=0.022$), and also their satisfaction regarding the specialization they are following ($F_{(3-108)}=3.035$, $p=0.032$).

A post hoc Tukey test revealed that students with grades between 6.01 and 7 (p=0.043), students with grades between 9.01 and 10 (p=0.043), students with grades between 7.01 and 8 (p=0.017), and students with grades between 9.01 and 10 (p=0.017) exhibit different satisfaction levels regarding their exam grades. The Tukey post hoc test conducted for the other variables revealed that students who attended two classes per week had different levels of satisfaction regarding elective courses than students who attended four or more classes per week (p=0.023). Moreover, students who attended two classes per week had different levels of satisfaction than students who attended three classes per week (p=0.020) and students who attended four or more classes per week (p=0.043).

Table 3. ANOVA results for level of grades, class attendance and satisfaction variables

Dependent variables (satisfaction items)	**Independent variables**			
	Level of grades		**Class attendance**	
	F.	**Sig.**	**F.**	**Sig.**
Course quality	0.854	0.494	1.829	0.146
Seminars/laboratories	1.484	0.212	0.677	0.568
Elective courses	0.445	0.776	3.329	0.022*
Internship	1.426	0.230	1.075	0.363
Professors' answers to questions	1.195	0.317	0.694	0.558
Internship tutor's answers to questions	1.618	0.175	1.081	0.361
Grades at exams	3.299	0.014*	1.647	0.183
Grades for projects	0.610	0.656	0.572	0.634
Faculty facilities	1.345	0.258	1.018	0.388
Specialization followed	0.564	0.689	3.035	0.032*

* $p < 0.05$.

Source: authors' own calculations based on data gathered

This study also aimed to identify whether there was any statistically significant correlation between the perceived skills needed by tourism managers and the future career path these students wished to follow. The career path is represented by two variables that reflect tourism students desire to become (1) entrepreneurs, and (2) managers. The descriptive statistics and correlation results for these variables are presented in Table 4, while Table 5 presents the results of the regression analysis for the two career paths. The first model (entrepreneurial intention) accounts for 12.5% of the variance and the second model (managerial intentions) accounts for 11.3 % of the variance.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Table 4. Descriptive statistics

Variables	M	SD	1	2	3	4	5	6	7
1. Leadership	4.33	0.702							
2. Risk taking	4.18	0.762	0.411***						
3. Task delegation	3.94	0.797	0.488***	0.493***					
4. Decision making	4.38	0.688	0.481***	0.453***	0.537***				
5. Networking	4.02	0.771	0.105	0.117	0.383***	0.412***			
6. Optimism	4.21	0.902	0.119	0.222**	0.056	0.293**	0.241**		
7. Entrepreneurs	3.10	1.057	0.187*	0.034	0.104	-0.028	0.086	0.206*	
8. Managers	3.63	1.147	0.219*	0.096	0.073	0.043	0.191*	0.108	0.543**

* p < 0.05, ** p < 0.01, *** p < 0.001.

Source: authors' own calculations based on data gathered

The results in Table 4 show that optimism (β=.291, p<0.05) is positively related to the desire to become an entrepreneur, while risk taking skills (β=-.088, p<0.05) and decision- making skills (β=-.452, p<0.05) are negatively related to the desire to become an entrepreneur. In terms of a management career, the results show that leadership skills have a positive influence on students' desire to follow such a path (β=.495, p<0.01). At the same time, the ability to create networks with other people was positively related to the desire to pursue a management career in the tourism field (β=.387, p<0.05).

Table 5. Results of the regression analysis

Variables	Career path	
	Model 1	Model 2
Constant	1.467 (1.748)	1.249 (1.362)
Leadership	.384 (2.268)	0.495** (2.673)
Risk taking	-.088* (-0.559)	0.107 (0.626)
Task delegation	.164 (0.974)	-0.148 (-0.804)
Decision making	-.452* (-2.354)	-0.341 (-1.625)
Networking	.111 (0.749)	0.387* (2.395)
Optimism	.291* (2.501)	0.075 (0.591)
Model summary		
Model F	2.491	2.227
R^2	0.125	0.113
Adjusted R^2	0.075	0.062

Dependent variable = Model 1 (Entrepreneurs), Model 2 = Managers
*p < 0.05, ** p < 0.01 (Values in parentheses represent t values)

Source: authors' own calculations based on data gathered

5. Discusion

The results of the study are extremely illuminating. This paper was aimed to elucidate the concept of satisfaction among tourism students and the link between perceived skills and future career path. Although a small number of previous studies have investigated the perceptions of tourism students, none have done so from this perspective.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

The findings will be useful for key decision makers in academia and for managers that work in the tourism industry.

The focus of the research throughout was on tourism students. We believe they should be treated as equal partners by universities because they act as key stakeholders. Furthermore, some scholars (e.g., Finney and Finney, 2010) have developed the theory of students-as-customers to highlight the importance of students, both for universities and the companies in which they will work.

The issue of student satisfaction has been investigated by scholars using a variety of different methods (Brown, 1976; Marsh, Overall, and Thomas, 1976). The current study looked at satisfaction from a broader perspective, as it took into consideration several elements that contribute to the overall student experience. For example, the ANOVA results revealed significant differences between the mean scores of satisfactions regarding their grades, and such differences were related to exam performance. This suggests that students with higher grades will be more interested in how they perform during the exams which could affect their satisfaction towards their grades. From a theoretical point of view, the results diverge from those in previous studies that have found little or no relationship between grades and student satisfaction (Hildebrand, Wilson, and Dienst, 1971). Thus, as Howard and Maxwell (1980) noted, the question of whether student grades impact satisfaction cannot be answered in a simple yes/no manner. On the other hand, there is enough evidence that points towards a strong relationship between students' grades and their academic performance (Sulphey, AlKahtani, and Abdul Malik Syed, 2018).

A more noteworthy result was obtained when a one-way ANOVA was performed for satisfaction items and class attendance. Differences in perceived satisfaction were revealed regarding the elective courses and specialization followed. According to Astin (1999), students' attendance at classes is more strongly related to satisfaction than any other type of involvement. The ability of key academic decision makers to encourage students' involvement with faculty can therefore prove to be a highly productive activity in most campuses.

During the survey, students were asked about their intentions regarding their future career paths. Empirical evidence was provided for these career traits and the perceived skills needed for a management career in tourism. Tourism students who consider leadership skills to be important for tourism managers are more likely to work as managers in the tourism industry, while those who see relationship networks as essential for a future management career are more likely to work as managers. The intrinsic relationship between leadership skills and relationship networks is one of the most extensively researched topics in management science. Hogan and Warrenfeltz (2003), for example, argue that leadership skills are primarily related to building and maintaining effective teams. Leaders are not only responsible for the relations between their employees, but also for their relations with other leaders. A network of relationships may prove to be very efficient when managing a tourism business. The relationship between networking and new venture creation among students has also been addressed in previous studies. Mushtaq, Hunjra, Niazi, Rehman, and Azam (2010), for example, argue that networking enables young graduates to access information and other important assets that will increase their chances for starting a new business. Furthermore, the existence of networks is considered to influence small firm creation and, to some extent, new firm performance (Dubini and Aldrich, 1991). For a successful management career, students should demonstrate abilities to create and maintain tight networks with various stakeholders; however, this is not an easy task, as it takes time to build and develop appropriate networks.

From a theoretical point of view, our findings offer support for the optimism and chance theory (Storey, 2011). According to this theory, optimism is incorporated into various entrepreneurship models (Hmieleski and Baron, 2009; Simon, Houghton, and Aquino, 2000). Previous studies proved that optimistic individuals are more likely to follow an entrepreneurial path (Cassar, 2010; Cassar and Craig, 2009). The entrepreneurs are people who wish take risks and start their own business. One trait entrepreneurs possess is their ability to pursue a certain vision

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

and benefit from an existing business opportunity. Therefore, it makes sense for them to feel positive about their business and to not be disappointed by potential failures. As other scholars have observed, employees aspiring to start their own business often possess above average levels of optimism, which suggests that optimism has a causal influence on entrepreneurship (Dawson, De Meza, Henley, and Arabsheibani, 2012). Optimism is a very important personality trait for entrepreneurs. Recent studies showed that personality factors along with behavioral factors can explain the intention to be involved in an entrepreneurial activity (Naushad, 2018).

The present study incorporates some contradictory results. Traditionally, it was believed that human decision makers are risk averse. For managers, it is hard to establish a positive correlation between risks and return (March and Shapira, 1987). Nowadays, when the competition in the tourism industry is becoming fiercer every day, and tourists becoming more demanding, it is imperative for managers to gamble from time to time. To a certain degree, the success of a company may be influenced by various stakeholders. The relationships that managers develop with these stakeholders is therefore of great importance. However, students perceive risk taking and decision-making abilities to have a negative impact on their desire to become entrepreneurs. The latter skill can be shaped during business classes and training programs; however, the former is a personality trait that people either have or do not. Even though, students in our sample see optimism as an important element for an entrepreneurial path, they are not fully aware of some other traits that had been appointed as main determinants for entrepreneurship, such as risk taking attitude (Naldi, Nordqvist, Sjöberg, and Wiklund, 2007) or decision making ability.

6. Conclusions

The purpose of this study was twofold. Firstly, it addressed the issue of student satisfaction with university and, secondly, it explored the relationship between perceived skills and career path in a sample of tourism students studying at a large university in Romania. The present study highlights that fact the education process is complex and must be addressed with great care by decision makers. This study makes an important contribution to the existing literature on student career paths as it identifies skills that predict future entrepreneurial and managerial intentions within the tourism industry.

The results of the study could provide concrete guidelines for key decision makers within universities. A first practical implication refers to the importance of recognising those elements that contribute to students' satisfaction. Given these requirements, it is crucial that universities take into consideration the factors that create satisfaction among students. This could form part of a quality assurance process or it may be a proactive investigation conducted by the university. Whichever is the case, both students and the university could benefit. The universities should consider a broader spectrum of elements that are responsible for increased levels of student satisfaction. By approaching this issue only from a teaching point of view will not be enough to stimulate students.

Second, universities should become more responsible about the future career path of their graduates. This could imply early involvement of students in successful internships, field study programs and the strengthening of relationships with business. Moreover, we consider that universities should improve the learning process to help their tourism students succeed in their entrepreneurial or managerial future careers.

Teaching is an art and, like many other forms of art, can be compromised if the artist focuses exclusively on the technique. In this respect, instructors need to concentrate more on the pedagogical effects, which are partly enshrined in student satisfaction. For key decision makers in tourism programs this would be very useful, as actions could be undertaken to design courses that will allow training students to self-regulate their optimism so that they will be able to either constrain or emphasize their enthusiasm.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Like many previous studies, the present research nevertheless has some limitations. The first limitation of the study concerns the geographical range of the sample. The sample consists of students from one university in the North Western part of Romania to whom we had easy and direct access. These findings cannot be extrapolated to all Romanian students following a tourism specialization as results may vary from one region to another. Thus, future research should seek to recruit a nationwide sample. Other limitation of the study is that it measured tourism students' satisfaction levels based on predefined criteria. Consequently, in future research it may be useful to include other factors that have been pinpointed as essential for student satisfaction, such as socialization among students, professors' communication skills, and group work. Finally, the present study addressed students' entrepreneurial intention through attitudes, aspirations, personality traits, and willingness to network. The entrepreneurship literature may benefit if future studies focus on other factors that have been proved to influence the desire to become an entrepreneur, such as opportunity recognition, financial constraints, and previous work or entrepreneurial experience.

Acknowledgement

This work was supported by the strategic grant "Integrated system for improving the doctoral and postdoctoral research quality in Romania and for promoting the role of science in society", POSDRU/159/1.5/S/133652, co-funded by the European Social Fund through the Sectoral Operational Programme Human Resources Development 2007-2013.

European Research Council
Established by the European Commission

References

Adamson, S. J., Doherty, N., & Viney, C. (1998). The meanings of career revisited: implications for theory and practice. *British Journal of Management*, *9*(4), 251-259. https://doi.org/10.1111/1467-8551.00096

Aldridge, S., & Rowley, J. (1998). Measuring customer satisfaction in higher education. *Quality Assurance in Education*, *6*(4), 197-204. https://doi.org/10.1108/09684889810242182

Astin, A. W. (1999). Student involvement: a development theory for higher education, *Journal of College Student Development*, *40*(5), 518-539.

Barron, P., Maxwell, G., Broadbridge, A., & Ogden, S. (2007). Careers in hospitality management: generation Y's experiences and perceptions. *Journal of Hospitality and Tourism Management*, *14*(2), 119-128. https://doi.org/10.1375/jhtm.14.2.119

Baruch, Y. (2004). Transforming careers: from linear to multidirectional career paths: organisational and individual perspectives. *Career Development International*, *9*(1), 58–73. http://dx.doi.org/10.1108/13620430410518147

Borden, V. M. H., & Owens, J. L. (2001). *Measuring quality: choosing among surveys and other assessments of college quality*. Washington: American Council on Education and Association for Institutional Research.

Bridgstock, R. (2011). Skills for creative industries graduate success. *Education & Training*, *53*(1), 9-26. https://doi.org/10.1108/00400911111102333

Brown, D. L. (1976). Faculty ratings and student grades: A university-wide multiple regression analysis. *Journal of Educational Psychology*, *68*, 573-578. http://dx.doi.org/10.1037/0022-0663.68.5.573

Brown, R., & Mazzarol, T. (2009). The importance of institutional image to student satisfaction and loyalty within higher education. *Higher Education*, *58*(1), 81-95. https://doi.org/10.1007/s10734-008-9183-8

Browne, B., Kaldenberg, D., Browne, W., & Brown, D. (1998). Student as customers: factors affecting satisfaction and assessments of institutional quality. *Journal of Marketing for Higher Education*, *8*(3), 1-14. https://doi.org/10.1300/J050v08n03_01

Cassar, G. (2010). Are individuals entering self-employment overly optimistic? An empirical test of plans and projections on nascent entrepreneur expectations. *Strategic Management Journal*, *31*(8), 822-840. http://dx.doi.org/10.2139/ssrn.945206

Cassar, G., & Craig, J. (2009). An investigation of hindsight bias in nascent venture activity. *Journal of Business Venturing*, *24*(2), 149-164. https://doi.org/10.1016/j.jbusvent.2008.02.003

Chi, C. G., & Gursoy, D. (2009). How to help your graduates secure better jobs? An industry perspective. *International Journal of Contemporary Hospitality Management*, *21*(3), 308-322. https://doi.org/10.1108/09596110910948314

Cronin, J. J. Jr, Brady, M. K., & Hult, G. T. M. (2000). Assessing the effects of quality, value, and customer satisfaction on consumer behavioral intentions in service environments. *Journal of Retailing*, *76*(2), 193-218. https://doi.org/10.1016/S0022-4359(00)00028-2

Dalati, S., & Al Hamwi, S. E. (2016). Sustainable development in higher education through service quality and price fairness: empirical evidence from private universities in Damascus, Syria, Entrepreneurship and Sustainability Issues, *4*(1), 25-38. http://dx.doi.org/10.9770/jesi.2016.4.1(3)

Dawson, C., De Meza, D. E., Henley, A., & Arabsheibani, G. R. (2012). Entrepreneurship: Cause or consequence of financial optimism? Discussion Paper Series, Forschungsinstitut zur Zukunft der Arbeit, No. 6844 [Available online at: http://www.econstor.eu/handle/10419/67175], Retrieved on September 8, 2017.

Delaney, A. (2005). Expanding students' voice in assessment through senior survey research. *American Institutional Research Professional File*, *96*, 1-19.

DeShields, O., Kara, A., & Kaynak, E. (2005). Determinants of business student satisfaction and retention in higher education: Applying Herzberg's two-factor theory. *International Journal of Educational Management*, *19*(2), 128-139. https://doi.org/10.1108/09513540510582426

Doherty, L., Guerrier, Y., Jameson, S., Lashley, C., & Lockwood, A. (2001). *Getting ahead: Graduate careers in hospitality management*. London: CHME/HEFCE.

Douglas, J., & Douglas, A. (2006). Evaluating teaching quality. *Quality in Higher Education*, *12*(1), 3-12. https://doi.org/10.1080/13538320600685024

Dubini, P., & Aldrich, H. (1991). Personal and extended networks are central to the entrepreneurial process. *Journal of Business Venturing*, *8*(3), 305–313. https://doi.org/10.1016/0883-9026(91)90021-5

Elliott, K. M., & Shin, D. (2002). Student satisfaction: an alternative approach to assessing this important concept. *Journal of Higher Education Policy and Management*, *24*, 197-209. https://doi.org/10.1080/1360080022000013518

Farrell, A. M., Souchon, A. L., & Durden, G. R. (2001). Service encounter conceptualization: employees' service behaviors and customers' service quality perceptions. *Journal of Marketing Management*, *17*, 577-593. https://doi.org/10.1362/026725701323366944

Finney, T. G., & Finney, R. Z. (2010). Are students their universities' customers? An exploratory study. *Education & Training*, *52*(4), 276-291. https://doi.org/10.1108/00400911011050954

Flum, H., & Blustein, D. L. (2000). Reinvigorating the study of vocational exploration: a research framework. *Journal of Vocational Behavior*, *56*(3), 380-404. https://doi.org/10.1006/jvbe.2000.1721

Franklin, K., & Knight, W.H. (1995). Using Focus Groups to Explore Student Opinion, paper presented at the *Annual Meeting of the Mid-South Educational Research Association Conference*, Biloxi, MS, November.

Franz, R. S. (1998). Whatever you do, don't treat your students like customers! *Journal of Management Education*, *22*(1), 63-69.

Gruber, T., Fuß, S., Voss, R., & Glaser-Zikuda, M. (2010). Examining student satisfaction with higher education services using a new measurement tool. *International Journal of Public Sector Management*, *23*(2), 105-123. https://doi.org/10.1108/09513551011022474

Guolla, M. (1999). Assessing the teaching quality to student satisfaction relationship: Applied customer satisfaction research in the classroom. *Journal of Marketing Theory and Practice*, *7*(3), 87-97. https://doi.org/10.1080/10696679.1999.11501843

Hall, D. T., & Mirvis, P. H. (1995). The new career contract: developing the whole person at midlife and beyond. *Journal of Vocational Behavior*, *47*(3), 269-289. https://doi.org/10.1006/jvbe.1995.0004

Hassel, H., & Lourey, J. (2005). The dearth of student responsibility. *College Teaching*, *53*(1), 2-12.

Hildebrand, M., Wilson, R. C., & Dienst, E.. R. (1971). *Evaluating university teaching.* Berkeley: Center for Research and Development in Higher Education, University of California, Berkeley.

Hmieleski, K.M., & Baron, R. A. (2009). Entrepreneurs' optimism and new venture performance: A social cognitive perspective. *Academy of Management Journal*, *52*(3), 473-488. https://doi.org/10.5465/amj.2009.41330755

Hogan, R., & Warrenfeltz, R. (2003). Educating the modern manager, *Academy of Management Learning and Education*, *2*(1), 74-84.

Howard, G. S., & Maxwell, S. E. (1980). Correlation between student satisfaction and grades: A case of mistaken causation? *Journal of Educational Psychology*, *72*(6), 810-820. http://dx.doi.org/10.1037/0022-0663.72.6.810

Kanter, R. M. (1989). *When giants learn to dance*. London: Simon & Schuster.

Kong, H., Cheung, C., & Zhang, H. Q. (2010). Career management systems: what are china's state-owned hotels practicing? *International Journal of Contemporary Hospitality Management*, *22*(4), 467-482. https://doi.org/10.1108/09596111011042695

Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *Review of Higher Education*, *24*(3), 309-332. http://dx.doi.org/10.1353/rhe.2001.0005

Kusluvan, S., & Kusluvan, Z. (2000). Perceptions and attitudes of undergraduate tourism students towards working in the tourism industry in Turkey. *Tourism Management*, *21*, 251-269. https://doi.org/10.1016/S0261-5177(99)00057-6

Ladkin, A. (2002). Career analysis: a case study of hotel general managers in Australia. *Tourism Management*, *23*(4), 379-388. https://doi.org/10.1016/S0261-5177(01)00092-9

Ladkin, A., & Juwaheer, A. (2000). The career paths of hotel general managers in Mauritius. *International Journal of Contemporary Hospitality Management*, *12*(2), 119-125. https://doi.org/10.1108/09596110010309925

Ladkin, A., & Riley, M. (1996). Mobility and structure in the career paths of UK hotel managers: A labour market hybrid of the bureaucratic model?. *Tourism Management*, *17*(6), 443-452. https://doi.org/10.1016/0261-5177(96)00053-2

Lewis, A., & Airey, D. (2001). Tourism careers in Trinidad and Tobago: Perceptions of secondary school students. *Tourism and Hospitality Research*, *3*(1), 7–20.

Lockyer, C., & Scholarios, D. (2004). Selecting hotel staff: Why best practice does not always work. *International Journal of Contemporary Hospitality Management*, *16*(2), 125-136. https://doi.org/10.1108/09596110410520016

March, J. G., & Shapira, Z. (1987). Managerial perspectives on risk and risk taking. *Management Science*, *33*(11), 1404-1418. https://doi.org/10.1287/mnsc.33.11.1404

Marsh, H. W., Overall, J. U., & Thomas, C. S. (1976). *The relationship between students' evaluation of instruction and expected grade.* Los Angeles: University of California.

Martin, A., Mactaggart, D., & Bowden, J. (2006). The barriers to the recruitment and retention of supervisors/managers in the Scottish tourism industry. *International Journal of Contemporary Hospitality Management*, *18*(5), 380-397. https://doi.org/10.1108/09596110610673529

McCabe, V. (2001). Career paths and labour mobility in the conventions and exhibitions industry in Eastern Australia: Results from a preliminary study. *International Journal of Tourism Research*, *3*, 493–499. https://doi.org/10.1002/jtr.338

Mushtaq, H. A., Hunjra, A. I., Niazi, G. S. K., Rehman, K. U., & Azam, R. I. (2011). Planned behavior entrepreneurship and intention to create a new venture among young graduates. *Management & Marketing. Challenges for the Knowledge Society*, *6*(3), 437-456.

Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. Family Business Review, *20*(1), 33-47. https://doi.org/10.1111/j.1741-6248.2007.00082.x

Naushad, M. (2018). A study on the antecedents of entrepreneurial intentions among Saudi students, *Entrepreneurship and Sustainability Issues*, *5*(3), 600-617. http://doi.org/10.9770/jesi.2018.5.3(14)

Noe, R. A. (1996). Is career management related to employee development and performance? *Journal of Organizational Behavior*, *17*, 119-133. https://doi.org/10.1002/(SICI)1099-1379(199603)17:2<119::AID-JOB736>3.0.CO;2-O

Nunnally, J. C. (1978). *Psychometric theory*. 2nd edition, New York: McGraw-Hill.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1998). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*, 12-40.

Simon, M., Houghton, S., & Aquino, K. (2000). Cognitive biases, risk perception and venture formation: How individuals decide to start companies. *Journal of Business Venturing*, *15*(2), 113-134. https://doi.org/10.1016/S0883-9026(98)00003-2

Stafford, T. F. (1994). Consumption values and the choice of marketing electives: Treating students like customers. *Journal of Marketing Education*, *16*(2), 26-33. https://doi.org/10.1177/027347539401600204

Storey, D. J. (2001). Optimism and chance: The elephants in the entrepreneurship room. *International Small Business Journal*, *29*(4), 303–321. https://doi.org/10.1177/0266242611403871

Sulphey, M. M., AlKahtani, N.S., Abdul Malik Syed, A.M. (2018). Relationship between admission grades and academic achievement, Entrepreneurship and Sustainability Issues, *5*(3), 648-658. http://doi.org/10.9770/jesi.2018.5.3(17)

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Zikic, J., & Richardson, J. (2007). Unlocking the careers of business professionals following job loss: sense making and career exploration of older workers. *Canadian Journal of Administrative Sciences*, *24*, 58-73. https://doi.org/10.1002/cjas.5

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(22)

Ovidiu Niculae BORDEAN is an Associate Professor at Faculty of Economics and Business Administration, Babes-Bolyai University. He holds a PhD in Management from the Babes-Bolyai University of Cluj-Napoca. He was awarded a postdoctoral scholarship from the University of Economics in Bucharest. He was Vice-President of the Society for Business Excellence and Editorial Assistant of the journal *Management & Marketing. Challenges for the Knowledge Society*. His research interests focus on study of business strategies, corporate governance and entrepreneurship.
ORCID ID: https://orcid.org/0000-0001-5114-0570

Adrian SONEA is Assistant Professor at Faculty of Economics, Law and Administration, Petru Maior University of Târgu-Mureș. He received his PhD in Management from Babes-Bolyai University of Cluj-Napoca. Research interests: corporate competencies, sociology, management and business communication.
ORCID ID: https://orcid.org/0000-0003-1510-2504

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Publisher
http://jssidoi.org/esc/home

METHODOLOGICAL PROVISION FOR THE ASSESSMENT OF AUDIT RISK DURING THE AUDIT OF TAX REPORTING

Victoria I. Tarasova[1], Yuri V. Mezdrykov[2], Svetlana B. Efimova[3], Elena S. Fedotova[4], Dmitry A. Dudenkov[5], Regina V. Skachkova[6]

[1,2,3,4,5,6] Saratov Social and Economic Institute (branch) FGBOU IN "RER them. G.V. Plekhanov", 89, Radishcheva str., Saratov, 410003, Russia

E-mails: [1]Viki441@yandex.ru; [2]muvtir@mail.ru; [3]efimovas@rambler.ru; [4]fedotovaes@list.ru; [5]dudenkov.d.a@inbox.ru; [6]regina_sk@mail.ru

Received 22 March 2018; accepted 5 August 2018; published 30 September 2018

Abstract. The problematics and the goal of the research: The lack of theoretical foundations as well as the practical necessity for organizations to create a methodology for assessing the audit risk in carrying out the audit of tax reporting, determined the research objective: the development of theoretical and practical recommendations regarding the methodological provision for the assessment of audit risks as well as the methodology for establishing the relationship between the adequate tax reporting and the managerial decisions of owners on the basis of tax audit results. Methods used: a method based on the theory of fuzzy sets and the basics of the theory of information asymmetry. Results achieved: the development of a methodology for assessing an audit risk in carrying out the audit of tax reporting and establishment of relationship between the theory of information asymmetry and the effectiveness of the users' managerial decisions. The conclusions of the research: practical implementation of the methodology in organizations with different taxation systems has proved the relationship between the theory of information asymmetry and optimization of the users' managerial decisions. The practical benefits from the obtained results make it possible to increase the efficiency of organizations' activities and to confirm to the tax authorities the timeliness of the calculation and payment of taxes. These methods are the basis for the development of a theory for assessing audit risks in carrying out tax audits

Keywords: methodological provision, qualitative assessment, audit risk, tax audit, tax reporting, asymmetric information.

Reference to this paper should be made as follows: Tarasova, V.I.; Mezdrykov, Y. V.; Efimova, S.B.; Fedotova, E.S.; Dudenkov, D. A.; Skachkova, R.V. 2018. Methodological provision for the assessment of audit risk during the audit of tax reporting, *Enterpreneurship and Sustainability Issues* 6(1): 371-397. http://doi.org/10.9770/jesi.2018.6.1(23)

JEL Classifications: H 200

Additional disciplines: law

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

1. Introduction

In modern conditions, with the transition to the international audit standards and the improvement of the quality of audit services, the popularity of tax audits has increased especially as owners of organizations and other stakeholders need to obtain information depending on tax indicators for making optimal managerial decisions that affect the effectiveness of their organizations. The users of tax audit results can make effective managerial decisions having sufficient information about the indicators of adequate tax reporting. At the same time, the likelihood of an effective managerial decision made by stakeholders is significantly reduced if they do not have this information. Therefore, in this case, the asymmetry of information manifests itself when some users have sufficient information depending on the indicators of adequate tax reporting in making managerial decisions and some users do not possess this information, which can lead to inefficiency of these decisions.

The achieved level of audit risk in the audit of tax reporting affects the formation of the relevant audit opinion on the reliability of tax reporting. Therefore, before expressing an opinion about the reliability of tax reporting it is necessary to assess audit risks.

The methodological provision of the assessment of audit risk is relevant in conducting a tax audit. This relevance is confirmed by the fact that the system of international audit standards, which are currently used in Russia, implements a risk-oriented approach in conducting audits.

The current international audit standards do not fully disclose the methodology for assessing audit risks in relation to tax audit. The most important risk factors for this method are also not identified. In contrast to the audit of financial statements, in the tax audit, due to the complexity and ambiguity of the tax legislation, specific risk factors, which affect the difference in the methodology of their assessment, should be taken into account.

The lack of methodology for assessing audit risks in conducting tax audits makes it very difficult to establish the relationship between the theory of asymmetric information, indicators of adequate tax reporting and managerial decisions taken by the owners as the main stockholders based on the results of the tax audit.

The relevance of the researched topic and insufficient development of these problems determined the goal, objectives and structure of this work.

The goal of the study is to develop theoretical provisions and practical recommendations for improving the methodology for assessing audit risk in conducting tax audits and in developing a methodology for establishing the relationship between indicators of adequate tax reporting and managerial decisions made by owners based on the results of the tax audit.

2. Literature Review

Tax payments account for a large share in the organization's liabilities, and any untimely calculation of taxes, including due to the complications of the already conflicting norms in the tax legislation, increases the likelihood of a tax error of the organization, which will lead to penalties and the loss of a substantial portion of profits.

The confirmation of the accuracy of tax reporting regarding the calculation and payment of taxes is particularly relevant, not the confirmation of the entire volume of financial statements based on the results of mandatory audit. The higher probability of errors in tax reporting and close monitoring by the tax authorities led to the relevance of audit reports on tax audit.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

In conducting a tax audit there is always an audit risk present, which is an important factor affecting the audit report and the adequacy of tax reporting of the audited entity.

Insufficient development of methodological provision for assessing audit risks in conducting tax audits determined the choice of the topic for this article "Methodological provision for the assessment of audit risk during the audit of tax reporting". It should be noted that the audit of tax reporting is an important component of the tax audit.

Such researchers as Ju.P. Mendoza, J.L. Wielhouwer and E. Kirchler (2017), A.M. Oestreich (2017), L. Mittone, F. Panebianco and A. Santoro (2017), Yu. Kuchumova (2017), Ch. Kogler, L. Mittone and E. Kirchler (2016), K.H. Chan, A.W.Y. Lo and Ph.L.L. Mo (2015), John Incardona and others (2014), F. William and Jr. Messier (2014), P. Agrawal and Ph. Hancock (2012) in their scientific works consider the general issues of the theory of tax audit without examining the method for assessing audit risks in the audit of tax reporting, which is a problem in the theory of tax audit.

As part of this study, we will consider the methodology for assessing audit risk in the audit of tax reporting. It should be noted that in order to further study the methodological provision for assessing audit risks in conducting tax audits, it is necessary to develop a methodology for assessing audit risk in providing audit-based services related to tax audit.

Scientists have always been interested in the problem of asymmetric information. Among the researchers who made a significant contribution to the study of this problem one should distinguish (Būmane, 2018; Vickrey, 1949; 1960; Mirrlees, 1971; Akerlof, 1970; Stiglitz, 2003; Grossman & Stiglitz, 1980; Spence, 1973; Zemguliene & Valukonis, 2018).

In the 1940s an American economist W.S. Vickrey (1949) raised the problem of the optimal system for the taxation of revenues from the point of view of motivation (since each taxpayer, considering how hard he works, takes into account the tax scale) and from the point of view of asymmetric information (since the actual productivity of taxpayer's labor is not known to the state). Nevertheless, by proposing a solution to the problem in principle he was unable to overcome its mathematical complexity (Vickrey, 1960).

From our point of view, the theory of W.S. Vickrey (1949, 1960) is applicable in assessing audit risks in conducting a tax audit. In our opinion, based on the specific value of the audit risk that influences the auditor's opinion on the adequacy of tax reporting, the organization's owners and other stockholders receive an information about the indicators of tax reporting, which they use to make effective managerial decisions.

A quarter century later J. Mirrlees (1971) summarized the conclusions of W.S. Vickrey (1949, 1960) and used them for planning the profitability of the taxation system. He expanded the range of economic situations to be taken into consideration, which were characterized by asymmetric information, creating some general models for solving this problem (Mirrlees, 1971). From our point of view, the model of J. Mirrlees (1971) is also applicable in assessing the risks of tax audit. It makes it possible to optimize the taxation of organizations, to minimize tax payments and to reduce the risk of imposing fines on the organization.

In the early 70-ies the topic of asymmetric information in the economy was studied by such American economists as (Spence, 1973; Stiglitz, 2003; Akerlof, 1970).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Their theoretical models were based on the general theory of economic equilibrium, the essence of which is that any market economy approaches equilibrium in the form of a trend: there is a principle of interdependence of the basic elements of a market economy that ensures the unity of the system and influences the pursuit of equilibrium. But without its main prerequisite - automatic "clearing" of the markets, that is, without automatic adjustment of supply and demand with the help of rapid price changes. The reason for this is a lack of complete or reliable information as well as institutional constraints (Spence, 1973; Stiglitz, 2003; Akerlof, 1970).

We think that these theoretical models are applicable when conducting a tax audit in order to minimize the tax burden affecting the pricing policy of an organization. In our opinion, having information about the indicators of adequate tax reporting contained in the audit report based on the audit opinion depending on the level of audit risk, in particular, with respect to the taxation of transactions related to the sale of products, goods, works and services, the owners and managers of the audited organizations will be able to make effective managerial decisions based on the calculation of the organization's tax burden that influences the formation of the market price of products, thereby increasing the demand for the key segments of its activities making it possible to optimize the taxation of operations selling products, goods, works and services.

The importance of asymmetric information about the quality of goods was first analyzed by G.A. Akerlof (1970) in the work "The market of lemons": quality uncertainty and the market mechanism". In his work, G.A. Akerlof (1970) argues that insufficient information about the quality of the sold goods leads to the constant decrease in prices until the market disappears.

From our point of view, this model of markets with asymmetric information of G.A. Akerlof (1970) also confirms the thesis that with adequate information the users will be able to optimize their managerial decisions.

The problem of asymmetric information was analyzed by J. Stiglitz (2003) on the example of insurance companies. J. Stiglitz (2003) developed a mechanism of "reverse market adaptation", when under-informed market participants receive information from more informed participants. Together with M. Rothschild he showed the influence of information flows on the markets of insurance services, where companies do not have information about the level of risk relative to individual clients (Stiglitz, 2003). An insurance company (a poorly informed party) should effectively stimulate its clients (a well-informed party) in order for them to "provide" information about insurance risks (Stiglitz, 2003). S. Grossman and J. Stiglitz (1980) investigated the effectiveness of financial markets. The result of this analysis is known as the "Grossman-Stiglitz paradox": if the market is effective from an information point of view, that is, all the necessary information is determined at the price level, then no market participant has effective incentives to use information that is contained in prices (Grossman & Stiglitz, 1980).

From our point of view, the model of markets with asymmetric information of J. Stiglitz (2003) is applicable for assessing the risks in conducting a tax audit, since having information about the adequate tax reporting depending on the reached level of audit risk, the owners and managers of the audited organization will be able to timely and promptly make managerial decisions to reduce and minimize the level of tax risks.

Therefore, J. Stiglitz and S. Grossman (1980) and G.A. Akerlof (1970) proved that asymmetric information can lead to the reverse selection on the market.

M. Spence (1973) made a fundamental contribution to the modern economy of information. In addition to the study of market signals, he conducted a study of the practical implementation of the results obtained by W.S. Vickrey (1960) and J. Mirrlees (1971) in the analysis of insurance markets. M. Spence (1973) proved that, under

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

certain conditions, well-informed market participants can increase their market turnover by "transmitting signals" to the poorly informed market participants.

From our point of view, the theory of M. Spence (1973) is applicable in assessing the risks when conducting a tax audit by analogy with the model of markets with asymmetric information of J. Stiglitz (2003).

M. Spence (1973) noted that a good employee in order to get a salary higher than that of a bad employee tries to obtain some "token" (diploma, certificate of qualification) that would distinguish him from a bad employee. M. Spence (1973) called this token a signal. In our opinion, the availability of an appropriate diploma or certificate confirming the qualification in the field of taxation will make it possible to increase the efficiency of the internal audit service in the organization, the internal control over the calculation and payment of taxes by the organization, to minimize the risks and taxes.

The most important contribution of the scientist lies in the fact that thanks to this approach the employer chooses education as an important by-sign of the future employee, that is, the "expected balance" between education and remuneration. This balance between education and the salary of the future employee can affect, in particular, the effectiveness of internal control over the procedure for calculating and paying taxes by the organization and, consequently, on the effectiveness of the organization as a whole (Spence, 1973).

M. Spence (1973) also investigated the problem of the value of information not only within the market, but also in terms of economic development of the modern world. In the era of dynamic transformations, the developed countries of the world should not stand out among their neighbors with high customs duties, but look for ways of effective integration. However, the scientist believes that one should not absolutely rely on the market economy, although the market can help solve many problems. Since, in his opinion, the market participants do not have sufficient information, erroneous decisions are often made, which only the state can correct.

In addition, the lack of sufficient information on the adequate tax reporting increases the risk of imposing penalties on the organization by tax authorities.

The development of the theory of analysis of the market with asymmetric information by G.A. Akerlof (1970), M. Spence (1973) and J. Stiglitz (2003) conditioned the modification of the whole theory of the general market equilibrium. These scientists introduced new terminology while the market mechanism described by them is already intensively used in various spheres of management.

At the present in assessing risks during a tax audit there is no developed methodology of establishing the relationship between the theory of asymmetric information, indicators of adequate tax reporting and managerial decisions taken by the stakeholders.

We propose to establish this relationship for the first time. It will make it possible to make more effective managerial decisions, including minimization of organizations' tax risks.

3. Materials and Methods

To achieve this goal the following tasks had to be solved:

1) to develop methodological provision for the assessment of audit risks in the audit of tax reporting with the aim of establishing the relationship between the theory of asymmetric information, indicators of adequate tax reporting and managerial decisions made by the owners as the main stakeholders of the tax audit's results;

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

2) to develop a methodology for qualitative assessment of audit risk and its components in the audit of tax reporting;
3) to develop practical recommendations on the application of the methodology for assessing audit risk when auditing tax reporting for organizations in different taxation systems;
4) to carry out a comparative analysis of some values of the audit risk types (inherent, control risk and risk of non-detection) and the general audit risk in carrying out the audit of tax reporting of organizations in different taxation systems in order to establish the relationship between the achieved level of audit risk and the rationale for taking managerial decisions by the owners.

Throughout the tax audit an auditor needs to conduct inspection in such a way as to minimize the audit risk to an acceptable low level. The minimization of audit risk during the tax audit is caused by the interest of users in reliable indicators of tax reporting of the audited entity in order to optimize managerial decisions.

Therefore, the achieved level of audit risk in conducting a tax audit is an important indicator influencing the audit report and, accordingly, the reliability of tax reporting, which affects the effectiveness of managerial decisions by the interested users.

It should be noted that in order to optimize managerial decisions it is necessary to take into account the asymmetry of information.

The experimental base and the sample of the study are the results of assessment of audit risk in the audit of tax reporting at 3 companies with different taxation systems, namely, the general taxation system for LLC "SSK", a simplified taxation system for LLC "Liovar" (the objects of taxation are revenues and expenditures), a simplified taxation system for LLC "THE MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER" (the object of taxation includes revenues).

To establish this relationship, we will develop a methodology for assessing audit risks.

In auditing practice in order to conduct a qualitative audit of tax reports the auditor must assess the risks of substantial distortion of tax reporting.

ISA 315 "Identifying and Assessing the Risks of Material Misstatement through Understanding the Entity and Its Environment" (AICPA, 2017) provides for the identification and assessment of the risks of material misstatement due to fraud or errors at the level of financial statements and their prerequisites.

In the theory of audit and in the international practice there is no uniform methodology for assessing audit risks in auditing tax reports, which is a significant problem for the development of methodological provision for assessing audit risks.

The assessment of audit risk in conducting the audit of tax reporting involves the assessment of inherent risk, control risk and the risk of non-detection.

In practical audit activities two methods for assessing audit risk are identified: quantitative assessment and qualitative assessment.

The quantitative assessment of audit risks is based on probabilistic and static models for the assessment of audit risk and is more subjective in nature.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

In our opinion, in auditing tax reports it is necessary to apply a qualitative assessment of audit risks. This is related to the increased likelihood of significant distortions in the audit of tax reporting and the high responsibility of the audited entities and their managers for tax violations, the tax specifics of risk factors in the audit of tax reporting in contrast to the audit of accounting (financial) statements.

Therefore, from our point of view, in assessing the level of audit risk in the auditing of tax reporting it is necessary to apply the methods based not on probabilistic and statistical methods, but on the professional judgment of the auditor. In assessing audit risks in conducting the audit of tax reporting auditors should have special knowledge in the field of tax legislation, judicial practice in tax matters and other significant tax issues in order to express their professional judgment. The tax peculiarities of risk factors in carrying out the audit of tax reporting involve an objective assessment of audit risk and its components based on the professional judgment of the auditor in order to further develop audit procedures aimed at reducing audit risks to acceptable levels. Therefore, in view of the above, in conducting the audit of tax reporting it is necessary to apply a qualitative assessment of audit risk, which will make it possible to carry out more objective assessments of audit risks and to increase the reliability of tax reporting.

The qualitative assessment of audit risks is carried out on the basis of professional judgment of the auditor at the level of tax reporting in general and at the level of preconditions for the types of transactions with tax accounting, balances on tax accounting accounts and disclosure of tax information and is based on the analysis of factors of inherent risk, control risk and non-detection risk.

In the international practice the models of assessing audit risks based on the methods of fuzzy sets, expert assessments and probability theory are used. However, in the audit theory there is no single information on the application of these methods in assessing audit risks in the auditing of tax reporting.

Most authors in their scientific works use the method of risk ranking. From our point of view, the assessment of audit risk by the method of ranking has a subjective character. For objective assessment of audit risk in carrying out the audit of tax reporting we propose to perform a qualitative assessment of the components of audit risk by using a method based on the theory of fuzzy sets.

The method of qualitative assessment of audit risk in carrying out the audit of tax reporting has specific features that include the differences in the components of audit risk in different taxation systems and determination on their basis of the functions of the audit risk that affect the discrepancy in the relationship between adequate tax reporting and the optimal managerial decisions taken by the interested users in different taxation systems.

In order to determine these specific features, we assessed the inherent risk, the control risk and the risk of non-detection in three companies with different taxation systems with the objective of assessing the general audit risk based on all risk assessments, and based on the results of comparative analysis of the results of these risks' assessment to identify the relationship between reliable tax reporting and optimal managerial decisions taken by the owners as the main stakeholders.

4. Results and Discussion

We offer to consider practical application of an inherent risk assessment using the fuzzy sets method when conducting an audit of the profit tax at SSK LLC for 2016.

The main activity of the SSK LLC is wholesale trade of timber, building materials and sanitary equipment.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

An inherent risk in audit of tax accounting on income tax should be calculated on the basis of data on financial results report and the income tax return.

In assessing the inherent risk in audit of tax accounting for income tax in SSK LLC, the auditor should take following inherent risk factors into account:

- features of the type of activity of the SSK LLC organization, which affect the formation of the tax base of income tax: wholesale trade with timber, building materials and sanitary equipment;
- peculiarities of imperfection of the tax legislation affecting formation of the tax base for income tax;
- peculiarities of determining the income depending on specifics of organization's activities affecting formation of the tax base for income tax:
- revenue from the sale of goods (works, services) of own production,
- revenue from the sale of purchased goods;
- peculiarities of specifics of determining non-operating income depending on specifics of organization's activities that affect the formation of the tax base for income tax are absent;
- peculiarities of determining of costs depending on specifics of organization's activities affecting formation of the tax base for income tax:
- direct expenses of taxpayers engaged in wholesale, small wholesale and retail trade in the current (reporting) tax period relating to goods sold, including the value of purchased goods sold;
- peculiarities of specifics of determining non-operating expenses, depending on specifics of organization's activities affecting formation of the tax base for income tax are absent;
- peculiarities of determining income that is not taken into account when determining the tax base for income tax;
- peculiarities of determining expenses that are not taken into account when determining the tax base for income tax;
- peculiarities of application of the method of determining the income and expenses – the SSK LLC applies the accrual method;
- peculiarities of accounting tax for income from sales;
- features of organization and procedure for maintaining tax accounting for depreciable assets – a linear method;
- peculiarities of the procedure for maintaining tax records for repair of fixed assets.

The fuzzy sets method assumes a breakdown of the level of inherent risk Rir into grades: low, average, high.

Let's construct a graph of the membership function of a factor X of inherent risk corresponding to a low, an average, a high risk (Figures 1-3).

Next, we construct the interval of values of the current value q of the indicator of the inherent risk level Q corresponding to division into gradations of the inherent risk level. Classification of current values of the indicator of the inherent risk level is based on professional judgment of an auditor and may differ from that one presented in Table 1.

In assessing the inherent risk during audit of tax accounting on income tax, we have constructed a classification of current values of the indicator of the inherent risk level with another excellent interval of the range of values of the inherent risk level in the sense of the increased risk of material misstatement inherent to specifics of tax audit for income tax compared to other taxes.

Let us introduce notions: f-the analyzed risk factor, N- total number of risk factors, i-current risk factor number.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Belonging of fuzzy set elements to a certain interval of the risk level q (low, average or high) is determined via using the membership function, where q is the domain of definition, and the unit interval is the range of the risk level [0,1].

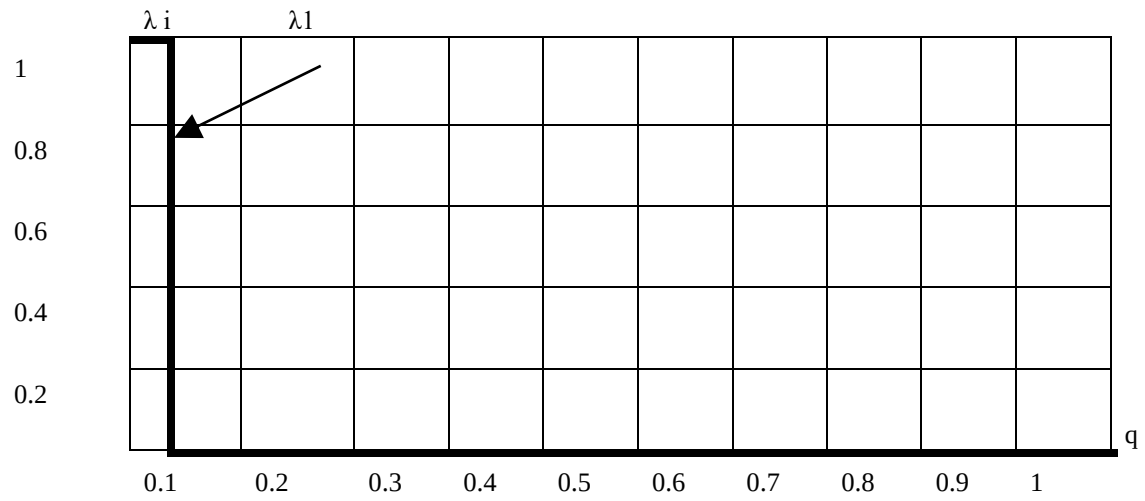


Fig. 1. The membership function of an inherent risk factor, low risk.

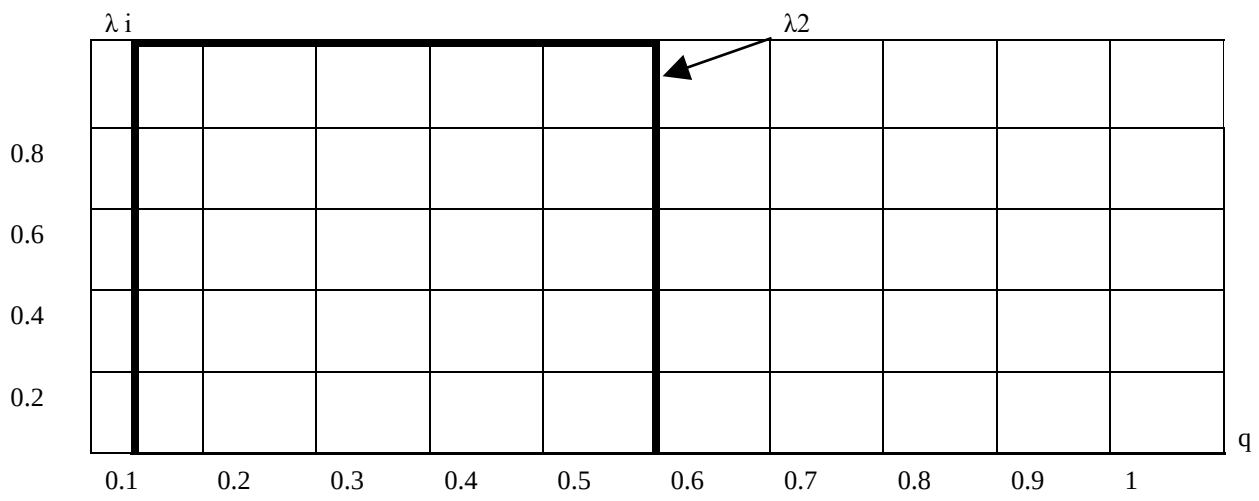


Fig. 2. The membership function of an inherent risk factor, average risk.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

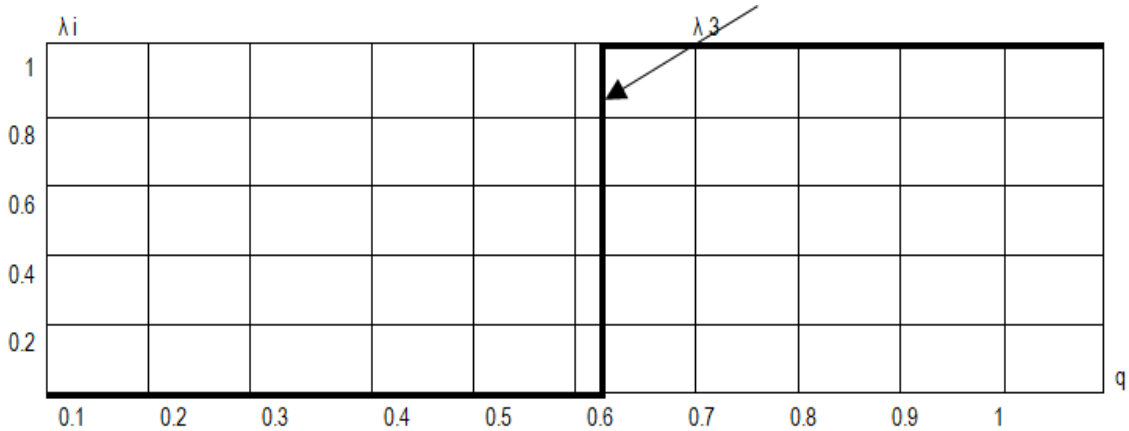


Fig. 3. The membership function of an inherent risk factor, high risk.

Table 1. Classification of current values of the indicator of the inherent risk level during audit of income tax accounting.

Interval of the range of values of the inherent risk level	Graduation of the inherent risk level
0<q≤0,04	Low risk level
0.05<q≤0,50	Average risk level
0.51<q≤1,00	High risk level

Next, we construct the rectangular membership function shown in graphs (Figure 1-3), where λij is the level of the factor belonging to the fuzzy subset of factor Q (low, average or high risk), j is the number of the subset (j = 1, 2, 3).

We introduce the notion of the significance rate of each risk factor – pi.

$$pi = \frac{1}{N} \quad (1.1)$$

Based on professional judgment of an auditor, we will determine whether inherent risk factors during audit of tax accounting on income tax are same or different in importance.

If inherent risk factors are of equal importance, then significance factors are determined by the formula (1.1).

If inherent risk factors are of different significance, an auditor should align factors in order of decreasing influence on the basis of his professional judgment. Then rates of significance of inherent risk factors can be determined by the Fishburn's formula (1.2, 1.3):

$$pi = \frac{qi}{\sum_{i=1}^{N} qi} \quad (1.2), \text{ where}$$

$$qi = \frac{2 \times (N - l + 1)}{(N - 1) \times n} \quad (1.3)$$

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Factors of inherent risk considered by us are different in importance and, therefore, they need to be aligned in order of decreasing influence. Rates of significance of inherent risk factors can be determined by the Fishburn's formula (1.2) and (1.3).

Definition of rates of significance of inherent risk factors during audit of tax accounting is presented in Table 2.

Table 2. Definition of rates of significance of inherent risk factors during conduct of audit of tax accounting on income tax.

Factor title	Risk factor	qi	pi
X1	The load of the chief accountant and his qualification in the field of taxation	0.5	0.33
X2	Features of organization of document circulation in tax accounting	0.4	0.27
X3	Tax legislation stability	0.3	0.20
X4	Peculiarities of determining revenue from sales affecting formation of the tax base	0.2	0.13
X5	Peculiarities of determining expenses that reduce the amount of income that affect formation of the tax base	0.1	0.07

Based on results obtained, we determine levels of belonging of risk factors (Table 3):

Table 3. Classification of levels of belonging to inherent risk factors.

Xi Factor risk title	λi risk factor membership levels		
	Low risk level	average risk level	High risk level
X1	1	0	0
X2	0	1	0
X3	0	0	1
X4	0	0	1
X5	0	0	1

Based on results of the audit procedures for interviewing, monitoring, and viewing of documents in SSK LLC, it was established that the factor X 1 is the load of the chief accountant and his qualification in the field of taxation in SSK LLC corresponds to a low risk, since the chief accountant has extensive experience in taxation and is not overloaded; Factor X2 are peculiarities of document management in tax accounting, corresponds to average risk, since the document circulation on tax accounting in SSK LLC is organized at an average level; factor X3 is the stability of tax legislation corresponds to high risk, as the tax legislation for the period under review has changed and affected calculated indicators for income tax; factor X4 are features of determining sales revenues that affect formation of the tax base corresponding to high risk, since the procedure for determining revenues from sales in SSK LLC is deviating from the norm; factor X5 is the specifics of determining expenses that reduce the amount of income that affect formation of the tax base that correspond to a high risk, since the procedure for determining the amount of expenses that reduce the amount of income is deviating from the norm at LLC SKK.

Then we determine the value of the risk level q based on the obtained values λij and rates of significance of the risk factors pi (1.4):

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

$$k = \sum_{j=1}^{3} qi \sum_{i=1}^{N} pi\lambda ij \quad (1.4),$$

where ki is the average value of the membership function for each interval determined from expression:

$$kj = (0,8 - 0,3) \times (j - 1) \quad (1.5)$$

Mean values of the membership function defined by formula (1.5) make:

k1=0,02 (low risk); k2=0,45(average risk); k3=0,49(high risk).

Resulting from the formula (1.4), we receive the following:

k=0,02×(0,33×1+0,27×0+0,20×0+0,13×0+0,07×0)+0,45×(0,33×0+0,27×1+0,20×0+0,13×0+0,07×0)+0,49×(0,33×0+0,27×0+0,20×1+0,13×1+0,07×1)=0,49.

According to classification of current values of the indicator of the inherent risk level (Table 1) we get the value of an inherent risk – the average one. Thus, in the SSK LLC, the inherent risk during audit of tax accounting is at an acceptable level, but at the same time, owners of SSK LLC should increase control over taking decisions by executive managers on correctness and timeliness of payment of income tax, compliance with requirements of the current tax legislation in terms of profit tax, review the accounting policy for profit tax purposes and improve its effectiveness, change the method for recognizing income and expenses, optimize taxation in order to minimize tax risks and reduce the tax burden in organization, since it is likely that the average inherent risk level can be transformed into a high one. In a similar manner, we will assess the risk of control means when conducting an audit of tax accounting on income tax, but with various risk factors. Let's construct a graph of the membership function of a control means risk factor corresponding to a low, an average, a high risk (Figures 4-6).

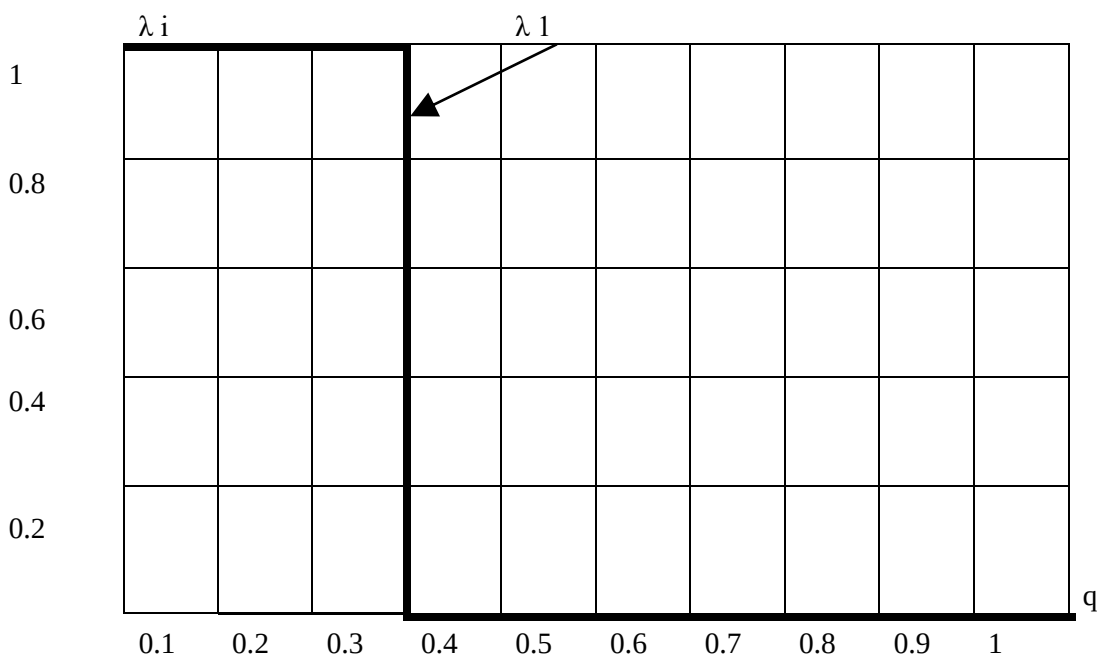


Fig. 4. The membership function of control means risk factor, low risk.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

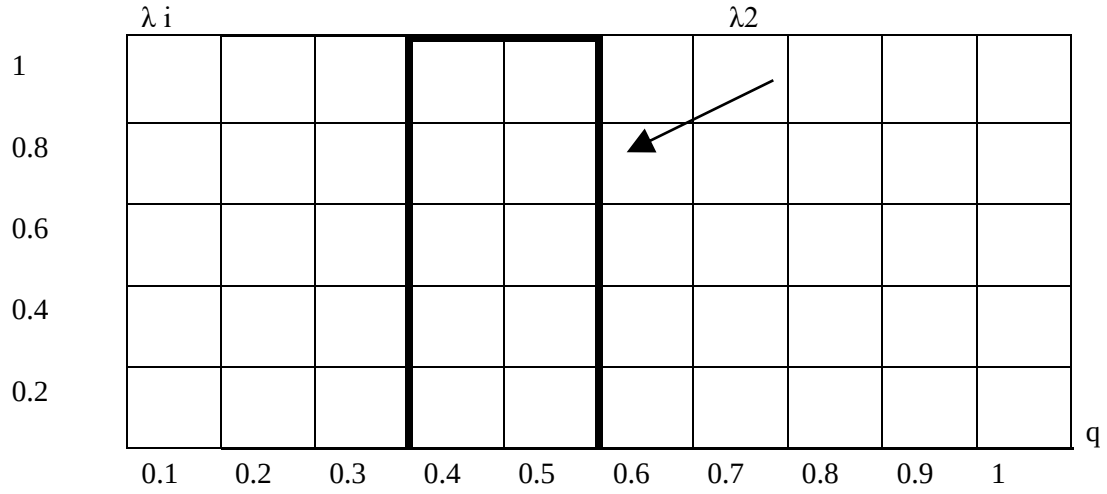


Fig. 5. The membership function of control means risk factor, average risk.

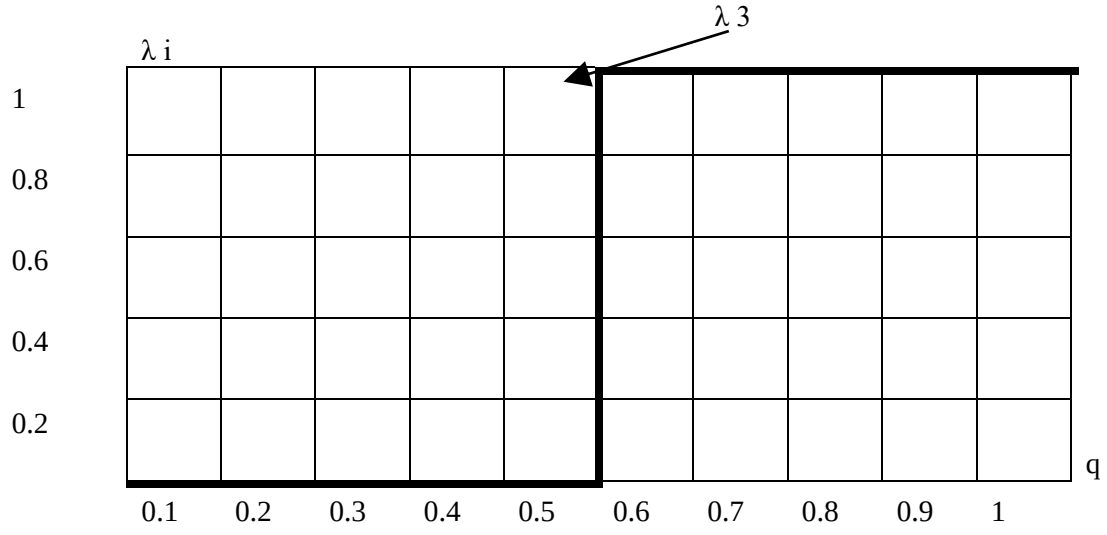


Fig. 6. The membership function of control means risk factor, high risk.

Next, we construct the interval of values of the current value q of the indicator of the inherent risk level Q corresponding to division into gradations of the control means risk level. Classification of current values of the indicator of the control means risk level is based on professional judgment of an auditor and may differ from that one presented in Table 4.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Table 4. Classification of current values of the indicator of control means risk level during audit of income tax accounting.

Interval of the range of values of the control means risk level	Gradation of the control means risk level
0<q≤0,29	Low risk level
0.30<q≤0,50	average risk level
0.51<q≤1,00	High risk level

In assessing the control means risk level during the audit of income tax accounting, we propose a different classification of current values of control means risk level due to the increased risk of inefficient functioning of the internal control system for identifying and preventing tax violations in the organization inherent to specifics of tax audit for a tax on profit in comparison with other taxes.

Definition of rates of significance of control means risk level during audit of tax accounting is presented in Table 5.

Table 5. Definition of rates of significance of control means risk level during conduct of audit of tax accounting on income tax.

Factor title	Risk factor	qi	pi
X1	The presence of an internal audit service that monitors and informs owners, management of tax violations, as well as monitoring the process of efficiency of the internal control system in the field of taxation	0.5	0.33
X2	Organization of an appropriate tax management order, compilation of tax accounting	0.4	0.27
X3	Establishment of risk assessment procedures in relation to tax accounting within the organization	0.3	0.20
X4	The presence of information systems that provide the procedure for preparing tax reports within the organization	0.2	0.13
X5	Functioning of the service for control over compliance with tax legislation within the organization	0.1	0.07

Mean values of the membership function defined by formula (1.5) make:

$$k1=0,15 \text{ (low risk)}; k2=0,20\text{(average risk)}; k3=0,49\text{(high risk)}.$$

Resulting from the formula (1.4), we receive the following:

$$k=0,15\times(0,33\times0+0,27\times0+0,20\times0+0,13\times1+0,07\times0)+0,20\times(0,33\times1+0,27\times1+0,20\times1+0,13\times0+0,07\times0)+0,49\times(0,33\times0+0,27\times0+0,20\times0+0,13\times0+0,07\times1)=0,21.$$

According to classification of current values of the indicator of the inherent risk level (Table 4) we get the value of an inherent risk – the low one.

Thus, in SSK LLC, the risk of control means during audit of tax reports is at an acceptable low level, which allows organization's owners to draw conclusions about reliability and effectiveness of the internal tax control system, that the organization is exercising due control to identify and prevent tax violations for income tax, which accordingly minimizes the risk of imposing penalties onto organization and affects improvement of production results and economic and financial activity of the organization.

Using a similar methodology, we estimate the non-detection risk at the SSK LLC with various risk factors.

Let's construct a graph of the membership function to the factor of non-detection risk corresponding to low, average, high risk (Figures 7-9).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

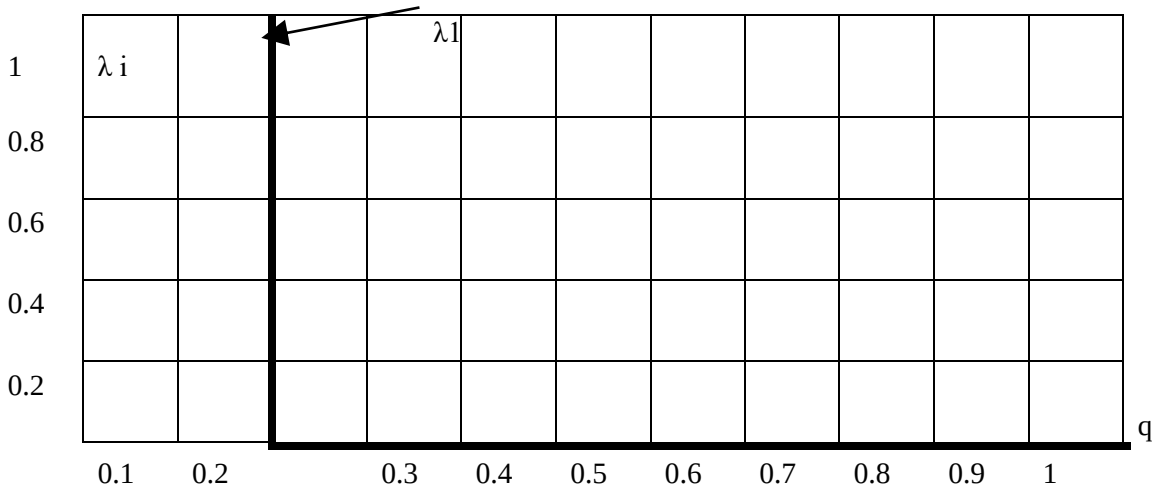


Fig. 7. The membership function of a non-detection risk, low risk.

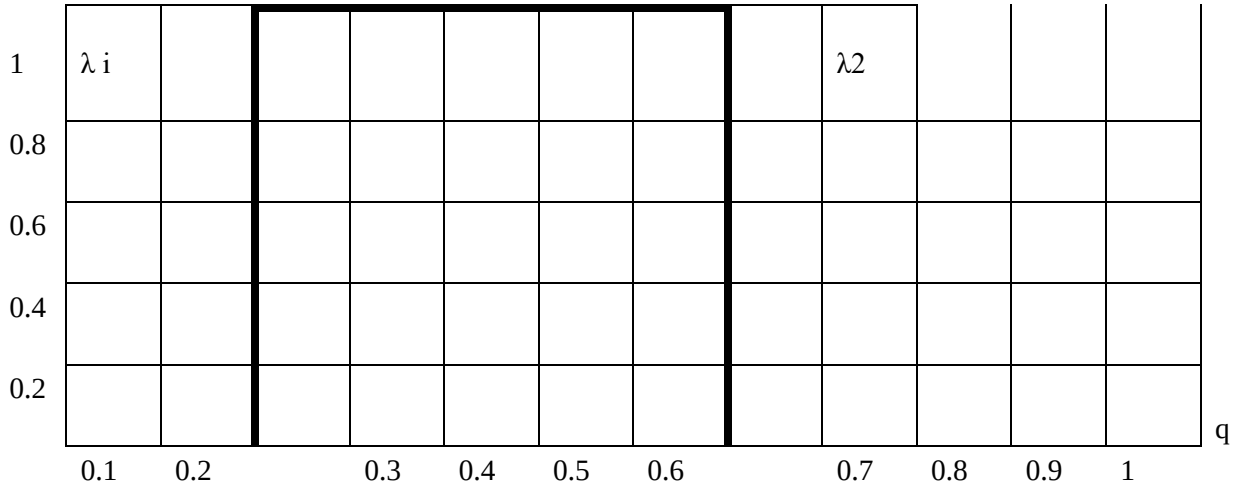


Fig. 8. The membership function of a non-detection risk, average risk.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

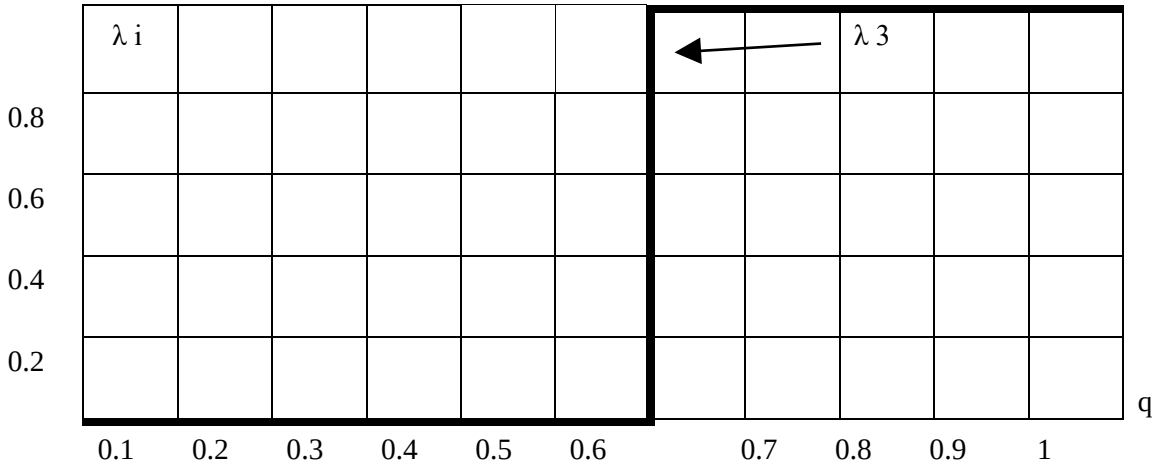


Fig. 9. The membership function of a non-detection risk, high risk.

Next, we construct the interval of values of the current value q of the indicator of the non-detection risk Q corresponding to division into gradations of the non-detection risk. Classification of current values of the indicator of the non-detection risk level is based on professional judgment of an auditor and may differ from that one presented in Table 6.

In assessing the non-detection risk during audit of tax accounting on income tax, we propose a different classification of current values of the indicator of the non-detection risk level in view of the increased risk of unidentified and unjustified tax violations in organization's activities inherent to specifics of the tax audit for the profit tax as compared to other taxes.

Table 6. Classification of current values of the indicator of the non-detection risk level during audit of income tax accounting.

Interval of the range of values of the non-detection risk level	Gradation of the non-detection risk level
0<q≤0,15	Low risk level
0.16<q≤0,55	average risk level
0.56<q≤1,00	High risk level

Definition of rates of significance of non-detection risk factors during audit of tax accounting is presented in Table 7.

Table 7. Definition of rates of significance of non-detection risk factors during audit of tax accounting on income tax.

Factor title	Risk factor	qi	pi
X1	Features of planning tax audit for income tax	0.5	0.33
X2	Features of inclusion of employees into the audit team with extensive experience in the field of taxation with the availability of appropriate certificates	0.4	0.27
X3	The use of a combination of selective non-statistical methods	0.3	0.20
X4	Economic security of employees included into the audit team acting within the current regulatory framework for tax legislation	0.2	0.13
X5	Conducting substantive check procedures at the end of the tax period	0.1	0.07

Based on results obtained, we determine levels of belonging of risk factors (Table 8):

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Table 8. Classification of levels of belonging to non-detection risk factors.

Xi Factor risk title	λi risk factor membership levels		
	Low risk level	average risk level	High risk level
X1	1	0	0
X2	0	1	0
X3	0	1	0
X4	1	0	0
X5	0	1	0

Based on the results of the audit procedures for interviewing, monitoring, and viewing of documents at the SSK LLC, it was established that the X-1 factor of planning of the tax audit for the profit tax at the SSK LLC corresponds to a low risk, since the audit check of the income tax is planned for a high level; The X2 factor are features of including employees into the audit team with extensive experience in the field of taxation, with availability of appropriate certificates corresponding to an average risk, since not all auditors have extensive experience and relevant certificates in the field of taxation; The X3 factor is the use of a combination of selective non-statistical methods corresponding to the average risk, since application of this method is established at an average level; The X4 factor is economic security of employees included into the audit team within the current regulatory framework for tax legislation corresponding to a low risk, since all employees included into the audit team are provided with an appropriate regulatory framework; The X5 factor is carrying out of substantive review procedures at the end of the tax period of the SSK LLC which corresponds to an average risk, as they are conducted in the middle of the tax period.

Mean values of the membership function defined by formula (1.5) make:

$$k1=0{,}08 \text{ (low risk)}; \; k2=0{,}39\text{(average risk)}; \; k3=0{,}44\text{(high risk)}.$$

Resulting from the formula (1.4), we receive the following:

$$k=0{,}08\times(0{,}33\times1+0{,}27\times0+0{,}20\times0+0{,}13\times1+0{,}07\times0)+0{,}39\times(0{,}33\times0+0{,}27\times1+0{,}20\times1+0{,}13\times0+0{,}07\times1)+0{,}44\times(0{,}33\times0+0{,}27\times0+0{,}20\times0+0{,}13\times0+0{,}07\times0)=0{,}26.$$

According to classification of current values of the indicator of non-detection risk level (Table 6), we get the non-detection risk value – the average one.

The achieved level of non-detection risk during the audit check of tax accounting allows owners to conclude that the tax accounting reflects reliable information on calculation and payment of taxes, the organization's tax risks are minimized, and there are good prerequisites for increasing profits of the organization.

Having assessed components of the audit risk during audit of tax accounting for income tax, we assess the audit risk at the level of tax accounting in general.

Let's construct a classification of current values of the audit risk membership function corresponding to the division into gradations of the risk level (low, average, high risk). At this, the classification of current values of the audit risk membership function may not coincide with classification of current values of components of the audit risk (see Table. 9).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Table 9. Classification of current values of the indicator of the auditor risk level during audit of income tax accounting.

Interval of the value range of the membership function of audit risk	Graduation of the auditor risk level
0<q≤0,05	Low risk level
0.06<q≤0,20	average risk level
0.21<q≤1,00	High risk level

The membership function of audit risk is calculated as the product of qualitative assessments of inherent risk, control means risk and non-detection risk using formula (1.6): $raud = rnt \times rk \times rn$.

Resulting from the formula (1.6), we receive the following:

$$0{,}49 \times 0{,}21 \times 0{,}26 = 0{,}03.$$

According to classification of current values of the indicator of the audit risk level (Table 9) we get the value of an audit risk – the low one.

Thus, the achieved audit risk in the SSK LLC is at an acceptable low level which confirms that the tax accounting accurately reflects the organization's obligations for calculation and payment of taxes, according to which owners can conclude that the probability of undisclosed and not corrected tax violations in activities of the organization is low and, therefore, there are good prospects for development of the organization and gaining of higher incomes.

Based on results of the audit of tax accounting of the SSK LLC, an interconnection was established between the theory of information asymmetry and substantiation for taking optimal management decisions by owners, which influenced the efficiency of financial and economic activities of the organization.

Next, let us consider practical application of audit risk assessment using the fuzzy sets method when auditing tax accounting for tax paid in connection with application of a simplified taxation system (15% incomes – expenses) in LIOVAR LLC for 2016.

The main activity of the LIOVAR LLC is production of other finished metal products.

Methodology for assessing auditor risk will be similar to that one described above with differences in risk factors.

Let's design intervals of values of the current value q of the Q - indicator of the level of risks, corresponding to the division into gradations of the level of risks. The classification of the current values of the risk level indicator is based on the professional judgment of the auditor and may differ from classification represented in Table 10.

Table 10. Classification of current values of the indicator of the level of risks in the audit of tax reporting for tax paid in connection with the using of a simplified taxation system.

Interval of the range of values of the level of inherent risk	Gradation of the inherent risk level	Interval of the values range of the risk level of control devices	Gradation of the risk level of control devices	Interval of the values range of the risk level of non-detection	Gradation of the risk level of non-detection
0<q≤0,06	Low risk level	0<q≤0,35	Low risk level	0<q≤0,15	Low risk level
0,07<q≤0,51	Middle risk level	0,36<q≤0,56	Middle risk level	0,16<q≤0,55	Middle risk level
0,52<q≤1,00	High risk level	0,57<q≤1,00	High risk level	0,56<q≤1,00	High risk level

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Determination of the coefficients of risk factors significance when carrying out audit of tax reporting is presented in Table 11.

Table 11. Determination of significance of risk factors coefficients when carrying out audit of tax reporting for tax paid in connection with using a simplified taxation system.

Name of risk factor	Inherent risk factor	Risk level of control devices factor	Risk level of non-detection factor	qi	pi
X1	The workload of the chief accountant and his qualifications in the field of applying of the simplified taxation system	The presence of an internal audit service that monitors and informs owners, management about tax violations, as well as monitoring the process of efficiency of the internal control system in the field of taxation	Features of tax audit planning for the tax paid in connection with the applying of the STS	0,5	0,33
X2	Features of the organization of work flow in tax registration	Correspondence of organizational structure to specificity of activity of the organization in the field of the taxation	Features of the engaging of employees in the audit team with extensive experience in the field of taxation, with the availability of appropriate certificates	0,4	0,27
X3	Stability of tax legislation in the field of applying a simplified taxation system	The order of accountability of employees for the calculation and taxes payment, the responsibility of employees for the committed tax offenses	The use of a combination of selective non-statistical methods	0,3	0,20
X4	Features of determining the income received on an accrual basis, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system	Features of the tax budget formation, indicators for calculating the taxable base and their compliance with the norms of the current tax legislation, other tax indicators affecting the calculation and payment of taxes	Features of the formation of the tax budget, indicators for calculating the taxable base and their compliance with the norms of the current tax legislation, other tax indicators affecting the calculation and payment of taxes	0,2	0,13
X5	Features of determining the incurred costs as a cumulative result, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system	Establishment of risk assessment procedures in relation to tax reporting in the organization	Carrying out of the verification procedures at the end of the tax period inherently	0,1	0,07

Based on the results obtained, we determine the levels of belonging to risk factors (see Table 12).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Table 12. Classification of belonging to risk factors levels.

Name of the risk factors	Levels of belonging to an inherent λ i risk factor			Levels of belonging to controls λ i risk factor			Levels of belonging to non-detection λ i risk factor		
	Low risk level	Middlerisk level	High risk level	Low risk level	Middlerisk level	High risk level	Low risk level	Middlerisk level	High risk level
X1	0	1	0	0	1	0	1	0	0
X2	0	1	0	1	0	0	0	1	0
X3	0	0	1	1	0	0	1	0	0
X4	0	1	0	0	1	0	1	0	0
X5	0	1	0	0	0	1	0	1	0

The average values belonging to an inherent risk, defined by formula (1.5), are:

k1=0,03(low risk); k2=0,44(middle risk); k3=0,48(high risk).

Based on formulas (1.4), we get:

$$k=0{,}03\times(0{,}33\times0+0{,}27\times0+0{,}20\times0+0{,}13\times0+0{,}07\times0)+0{,}44\times(0{,}33\times1+0{,}27\times1+0{,}20\times0+0{,}13\times1+0{,}07\times1)+0{,}48\times(0{,}33\times0+0{,}27\times0+0{,}20\times1+0{,}13\times0+0{,}07\times0)=0{,}45.$$

By classifying the current values of the indicator of the level of inherent risk (Table 10), we get the value of an inherent risk-average.

We calculate the average values of function of belonging to controls risk factor by formula (1.5):

k1=0,18(low risk); k2=0,20(middle risk); k3=0,43(high risk).

Based on the formula (1.4), we get:

$$k=0{,}18\times(0{,}33\times0+0{,}27\times1+0{,}20\times1+0{,}13\times0+0{,}07\times0)+0{,}20\times(0{,}33\times1+0{,}27\times0+0{,}20\times0+0{,}13\times1+0{,}07\times0)+0{,}43\times(0{,}33\times0+0{,}27\times0+0{,}20\times0+0{,}13\times0+0{,}07\times1)=0{,}2.$$

Thus, in LIOVAR LLC, the inherent risk in the audit of tax reports is at an acceptable level, but at the same time, the owners of LIOVAR LLC need to strengthen control over the decision-making by executive managers on the correctness and timeliness of the payment of tax paid in connection with the applying of the simplified system tax in compliance with the current tax legislation in the area of applying a simplified taxation system, improve the accounting policy for a simplified taxation system, improve the mechanism for preparing tax reports and the procedure for conducting tax accounting of expenses, optimize taxation in order to minimize tax risks and reduce the tax burden at LIOVAR LLC, since it is possible that the average level of inherent risk can be transformed into a high one.

According to the classification of the current values of the risk indicator of controls (Table 10), the value of the controls risk is low.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Thus, in LIOVAR LLC, the risk of controls during the audit of tax reports is at an acceptable low level, which allows the organization's owners to come to the conclusion that the system of internal control in terms of taxation is effectively functioning, also the tax violations are detected and prevented in the organization in a timely manner, which, accordingly, allows to minimize the tax risks of the organization and affects the improvement of the results of the production, economic and financial activities of the organization activity.

In accordance with the formula (1.5), we find the average values of the function of belonging to the risk of non-detection means:

$$k1=0{,}08 \text{ (low risk)}; \; k2=0{,}39\text{(middle risk)}; \; k3=0{,}44\text{(high risk)}.$$

$$k=0{,}08\times(0{,}33\times1+0{,}27\times0+0{,}20\times1+0{,}13\times1+0{,}07\times0)+0{,}39\times(0{,}33\times0+0{,}27\times1+0{,}20\times0+0{,}13\times0+0{,}07\times1)+0{,}44\times(0{,}33\times0+0{,}27\times0+0{,}20\times0+0{,}13\times0+0{,}07\times0)=0{,}18.$$

According to the classification of the current values of the indicator of the level of the non-detection risk (Table 8), we get the value of the non-detection-average risk.

The achieved level of non-detection risk during the audit of tax reporting allows owners to conclude that the tax reporting reflects reliable information on the calculation and tax payment on a simplified taxation system, the organization's tax risks are minimal, and there are good prerequisites for increasing profits in the organization.

Further, we will design a classification of the current values of the audit risk affiliation function, corresponding to a division into the gradation of the risk level (low, medium, high risk) (See Table 13).

Table 13. Classification of current values of the indicator of the audit risk level when audit of tax reporting for tax paid in connection with the applying of a simplified taxation system.

Interval of the value range of the audit risk affiliation function	Gradation level audit risk
$0<q\leq0{,}06$	Low risk level
$0{,}07<q\leq0{,}20$	Middle risk level
$0{,}21<q\leq1{,}00$	High risk level

We calculate the function of the attribution of audit risk by the formula (1.6):

$$k=0{,}45\times0{,}2\times0{,}18=0{,}04.$$

Thus, the achieved audit risk in LIOVAR LLC is at an acceptable low level, which confirms that the tax reporting accurately reflects the organization's obligations to calculate and pay tax on a simplified taxation system, depending on which the owners can come to the conclusion that the probability is not detected and not corrected tax violations in the activities of the organization is low and, thus, there are good prospects for the development of the organization and obtaining higher profits.

Based on the results of the audit of LIOVAR's tax reporting, it was proved that in order to optimize the management decisions of owners, it is necessary to take into account the asymmetry of information, which increased the efficiency of the organization's activities.

Further, let’s explore the practical applying of an inherent risk assessment using the fuzzy sets method when auditing the tax reporting for a tax paid in connection with the applying of a simplified taxation system (6% -

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

income) in MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC for the period of 2016.

The main activity of MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC is the services for the certification of welders and specialists in welding production, certification of welding equipment and technologies used at hazardous production facilities.
The methodology for assessing audit risk will be the same as for the two enterprises, but with a difference in risk factors.

Let's design intervals of values of the current value q of the indicator of the level of risks Q, corresponding to the division into gradations of the risks level. The classification of the current values of the risk level indicator is based on the professional judgment of the auditor and may differ from classification represented in Table 14.

Table 14. Classification of current values of the indicator of the level of risks in the audit of tax reporting for tax paid in connection with the using of a simplified taxation system

Interval of the range of values of the level of inherent risk	Gradation of the inherent risk level	Interval of the values range of the risk level of control devices	Gradation of the risk level of control devices	Interval of the values range of the risk level of non-detection	Gradation of the risk level of non-detection
0<q≤0,08	Low risk level	0<q≤0,37	Low risk level	0<q≤0,18	Low risk level
0,09<q≤0,53	Middle risk level	0,38<q≤0,58	Middle risk level	0,19<q≤0,59	Middle risk level
0,54<q≤1,00	High risk level	0,59<q≤1,00	High risk level	0,60<q≤1,00	High risk level

Determination of the coefficients of risk factors significance when carrying out the audit of tax reporting is presented in Table 15.

Table 15. Determination of significance of risk factors coefficients when carrying out audit of tax reporting for tax paid in connection with using a simplified taxation system.

Name of risk factor	Inherent risk factor	Risk level of control devices factor	Risk level of non-detection factor	qi	pi
The workload of the chief accountant and his qualifications in the field of applying of the simplified taxation system	The presence of an internal audit service that monitors and informs owners, management about tax violations, as well as monitoring the process of efficiency of the internal control system in the field of taxation	Features of tax audit planning for the tax paid in connection with the applying of the STS	The workload of the chief accountant and his qualifications in the field of applying of the simplified taxation system	0,5	0,33
Features of the organization of work flow in tax registration	Correspondence of organizational structure to specificity of activity of the organization in the field of the taxation	Features of the engaging of employees in the audit team with extensive experience in the field of taxation, with the availability of appropriate certificates	Features of the organization of work flow in tax registration	0,4	0,27
Stability of tax legislation in the field of applying a simplified taxation system	The order of accountability of employees for the calculation and taxes payment, the responsibility of employees for the committed tax offenses	The use of a combination of selective non-statistical methods	Stability of tax legislation in the field of applying a simplified taxation system	0,3	0,20
Features of determining the income received on	Features of the tax budget formation, indicators for	Features of the formation of the tax budget,	Features of determining the income received on	0,2	0,13

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

an accrual basis, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system	calculating the taxable base and their compliance with the norms of the current tax legislation, other tax indicators affecting the calculation and payment of taxes	indicators for calculating the taxable base and their compliance with the norms of the current tax legislation, other tax indicators affecting the calculation and payment of taxes	an accrual basis, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system		
Features of determining the incurred costs as a cumulative result, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system	Establishment of risk assessment procedures in relation to tax reporting in the organization	Carrying out of the verification procedures at the end of the tax period inherently	Features of determining the incurred costs as a cumulative result, affecting the formation of the tax base for the tax paid in connection with the applying of the simplified taxation system	0,1	0,07

Based on the results obtained, we determine the levels of belonging to risk factors (see Table 16):

Table 16. Classification of belonging to risk factors levels.

Name of the risk factors	Levels of belonging to an inherent λ i risk factor			Levels of belonging to controls λ i risk factor			Levels of belonging to non-detection λ i risk factor		
	Low risk level	Middlerisk level	High risk level		Low risk level	Middlerisk level	High risk level		Low risk level
X1	1	0	0	0	0	1	1	0	0
X2	0	1	0	1	0	0	0	1	0
X3	0	0	1	0	1	0	1	0	0
X4	0	1	0	0	1	0	1	0	0
X5	1	0	0	0	1	0	0	0	1

The average values belonging to an inherent risk, defined by formula (1.5), are:

k1=0,04(low risk); k2=0,44(middle risk); k3=0,46(high risk).

Based on formula (1.4), we get:

$$k=0{,}04\times(0{,}33\times1+0{,}27\times0+0{,}20\times0+0{,}13\times0+0{,}07\times1)+0{,}44\times(0{,}33\times0+0{,}27\times1+0{,}20\times0+0{,}13\times1+0{,}07\times0)+0{,}46\times(0{,}33\times0+0{,}27\times0+0{,}20\times1+0{,}13\times0+0{,}07\times0)=0{,}29.$$

By classifying the current values of the indicator of the level of inherent risk (Table 14), we get the value of an inherent risk-average.

Thus, in MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC, the inherent risk when carrying out the audit of tax reporting is at an acceptable level, but at the same time, the owners of LIOVAR LLC need to improve the current decision-making system of executive managers on the correctness and timeliness of tax payment, paid in connection with the application of a simplified taxation system, on compliance with the current tax legislation in the field of applying of the simplified taxation system , to improve the accounting policy under the simplified taxation system, to improve the mechanism for preparing tax reports and the procedure for conducting tax accounting of expenses, optimize taxation in order to minimize tax risks and

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

reduce the tax burden at MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC, since it is possible that the average level of inherent risk can be transformed into a high one.

In accordance with the formula (1.5), we find the average values of the function of belonging to the risk of non-detection means:

k1=0,19(low risk); k2=0,20(middle risk); k3=0,41(high risk).

Based on formula (1.4), we get:

$$k=0,19\times(0,33\times0+0,27\times1+0,20\times0+0,13\times0+0,07\times0)+0,20\times(0,33\times0+0,27\times0+0,20\times1+0,13\times1+0,07\times1)+0,41\times(0,33\times1+0,27\times0+0,20\times0+0,13\times0+0,07\times0)=0,29.$$

According to the classification of the current values of the controls risk indicator (Table 14), the value of the controls risk is low.

Thus, in MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC, the risk of controls in the audit of tax reporting is at an acceptable low level, which allows the organization's owners to conclude that the internal control system in terms of taxation is effective, due control is being exercised to prevent taxation delinquency, timely and complete elimination of their consequences, which, accordingly, allows to minimize the tax risks of the organization and affects the prospects increase in the organization's income.

In accordance with the formula (1.5), we find the average values of the function of belonging to the risk of non-detection means:

k1=0,09 (low risk); k2=0,39(middle risk); k3=0,41(high risk).

$$k=0,09\times(0,33\times1+0,27\times0+0,20\times1+0,13\times1+0,07\times0)+0,39\times(0,33\times0+0,27\times1+0,20\times0+0,13\times1+0,07\times1)+0,41\times(0,33\times0+0,27\times0+0,20\times0+0,13\times0+0,07\times0)=0,24.$$

According to the classification of the current values of the indicator of the risk level non-detection (Table 16), we get the value of the non-detection-average risk.

With an average level of non-detection risk achieved during the audit of tax reports, owners are recommended to strengthen control over the detection and prevention of tax violations in the organization's activities, since it is possible that the average level of risk of non-detection can be transformed into a high one (see Table 17).

Table 17. Classification of current values of the indicator of the audit risk level when audit of tax reporting for tax paid in connection with the applying of a simplified taxation system

Interval of the value range of the audit risk affiliation function	Gradation level audit risk
$0<q\leq0,08$	Low risk level
$0,09<q\leq0,24$	Middle risk level
$0,25<q\leq1,00$	High risk level

We calculate the function of the attribution of audit risk by the formula (1.6):

$$k=0,29\times0,29\times0,24=0,02.$$

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(23)

Thus, the auditor's risk achieved in AVERAGE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC is at an acceptable low level, which confirms that the tax reporting accurately reflects tax payments under the simplified taxation system, according to which the owners can conclude that the probability not identified and not corrected tax violations in the activities of the organization is low and, thus, there are good prospects for the development of organization and obtaining higher profits.
Based on the results of the study conducted, the audit risk assessments at 3 enterprises with different taxation systems were obtained in Table 18 of the function of attributing audit risk to the audit of tax reporting.

Table 18. Calculation of the function of the attribution of audit risk when carrying out the audit of tax reporting.

The function of belonging of audit risk			Interval of the value range of the audit risk affiliation function		
SSK LLC	LIOVAR LLC	MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC	SSK LLC	LIOVAR LLC	MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC
0,03	0,04	0,02	0<q≤0,05	0<q≤0,06	0<q≤0,08
			0,06<q≤0,20	0,07<q≤0,20	0,09<q≤0,24
			0,20<q≤1,00	0,21<q≤1,00	0,25<q≤1,00

From the calculations presented in Table 18, it can be concluded that the audit risk in SCC LLC, LIOVAR LLC, MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC is within the acceptable value of audit risk and, thus, the tax reporting reliably confirms information on the calculation and payment of taxes by these organizations, the probability of undetected tax violations is low.

Conclusions

Practical implementation of the methodology for assessing audit risks has proved the interconnections between the theory of information asymmetry and management decisions made by concerned users (owners), based on the audit results of tax reporting.

The importance of the conclusions of the investigated problem allows to increase the efficiency of the activities of the analyzed organizations, and also to confirm to the supervising tax authorities that the organization calculates and pays taxes in a timely manner, which leads to minimization of tax risks of these organizations.

Also, the conclusions of the problem under study on the methodological support of the assessment of audit risks are the basis for the development of theoretical bases for assessing audit risks when conducting an audit of tax reports and can be used in the process of teaching a scientific discipline on audit.

The problem of establishing the interdependence of the range of values of the level of audit risk in the audit of tax reporting from the level of materiality that would most fully justify the range of values of the indicator of the level of audit risk and affect the expression of the relevant audit opinion on the reliability of tax reporting data of audited persons remains unsolved in this study.

Acknowledgments

We would like to express my gratitude for providing the materials that served as the basis for the research, SSK LLC, LIOVAR LLC, and MIDDLE-VOLGA REGION SECOND HEAD CERTIFICATION CENTER LLC.

We are thankful to all the co-authors for their significant contribution to the study of issue.

References

AICPA. 2017. *Understanding the entity's activities and assessing the risks of material misstatement*. Retrieved from https://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-C-00315.pdf.

Agrawal, P.; & Hancock, Ph. 2012. Deimante Ltd.: Case study for introductory auditing course, *Journal of Accounting Education* 30(3-4): 355-379.

Akerlof, G.A. 1970. The Market for "Lemons": Quality Uncertainty and the Market Mechanism, *The Quarterly Journal of Economics* 84: 488-500.

Būmane, I. 2018. The methodology of the statement of comprehensive income and its impact on profitability: the case of Latvia, *Entrepreneurship and Sustainability Issues* 6(1): 77-86. http://doi.org/10.9770/jesi.2018.6.1(6)

Grossman, S.; & Stiglitz, J. 1980. On the Impossibility of Informationally Efficient Markets, *American Economic Review* 70: 393-408.

Chan, K.H.; Lo, A.W.Y.; & Mo, Ph.L.L. 2015. An empirical analysis of the changes in tax audit focus on international transfer pricing, *Journal of International Accounting, Auditing and Taxation* 24: 94-104.

Incardona, J.; Kannan, Y.; Premuroso, R.; Higgs, Ju.L.; & Huang, I. 2014. Taxing audit markets and reputation: An examination of the U.S. tax shelter controversy, *Journal of International Accounting, Auditing and Taxation* 23(1): 18-31.

Mendoza, Ju. P.; Wielhouwer, J.L.; & Kirchler, E. 2017. The backfiring effect of auditing on tax compliance, *Journal of Economic Psychology* 62: 284-294.

Kogler, Ch.; Mittone, L.; & Kirchler, E. 2016. Delayed feedback on tax audits affects compliance and fairness perceptions, *Journal of Economic Behavior & Organization* 124: 81-87.

Kuchumova, Yu. 2017. The Optimal Deterrence of Tax Evasion: The Trade-off between Information Reporting and Audits, *Journal of Public Economics* 145: 162-180.

Mirrlees, J. 1971. An Exploration in the Theory of Optimum Income Taxation, *Review of Economic Studies* 38(2): 175-208.

Mittone, L.; Panebianco, F.; & Santoro, A. 2017. The bomb-crater effect of tax audits: Beyond the misperception of chance, *Journal of Economic Psychology* 61: 225-243.

Oestreich, A.M. 2017. On optimal audit mechanisms for environmental taxes, *Journal of Environmental Economics and Management* 84: 62-83.

Spence, M. 1973. Job Market Signaling, *The Quarterly Journal of Economics* 87(3): 355-374.

Stiglitz, J. 2003. *Globalization: disturbing trends*. Moscow: National Socio-Scientific Foundation.

Vickrey, W.S. 1949. *Agenda for Progressive taxation*. New York: The Ronald press comp.

Vickrey, W.S. 1960. Utility, Strategy, and Social Decision Rules, *Quarterly Journal of Economics* 74: 507-535

William, F.; & Messier, Jr. 2014. An approach to learning risk-based auditing, *Journal of Accounting Education* 32(3): 276-287.

Zemguliene, J.; & Valukonis, M. 2018. Structured literature review on business process performance analysis and evaluation, *Entrepreneurship and Sustainability Issues* 6(1): 226-252. http://doi.org/10.9770/jesi.2018.6.1(15)

Victoria I. TARASOVA is a post-graduate student of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) FGBOU IN "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Yuri V. MEZDRYKOV is a doctor of Economic Sciences, Professor of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) of the Federal State Educational Establishment "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Svetlana B. EFIMOVA is a doctor of Economic Sciences, Professor of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) of the Federal State Educational Establishment "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Elena S. FEDOTOVA is a professor of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) FGBOU VE "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Dmitry A. DUDENKOV is a PhD of Economic Sciences, Associate Professor of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) FGBOU VE "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Regina V. SKACHKOVA is a PhD of Economic Sciences, Associate Professor of the Department of Accounting, Analysis of Economic Activities and Audit, Saratov Social and Economic Institute (branch) FGBOU VE "RER them. G.V. Plekhanov", Russian Federation
ORCID ID:

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Publisher
http://jssidoi.org/esc/home

IMPACT OF PRODUCTION AND TRANSACTION COSTS ON COMPANIES' PERFORMANCE ACCORDING ASSESSMENTS OF EXPERTS

Petrenko Elena [1], Sergey Pizikov [2], Nurlan Mukaliev [3], Anuar Mukazhan [4]

[1] Plekhanov Russian University of Economic, 117997, Moscow, Stremyanny lane 36, Russia
[2] Founadion for Informational Support for Society Development East Kazakhstan, 070018, Ust-Kamenogorsk city, Voroshilov str., 165, of. 20 Kazakhstan
[3]"VIMA" LLP Alash highway, 7, Baikonur Area, Astana Z01C1Y8, Kazakhstan
[4] Tsesnabank JSC, 24 Syganak st., Astana Z05K7B0, Kazakhstan

E-mails: [1]petrenko_yelena@bk.ru, [2]pizikov.s@gmail.com; [3] mu7kaliev@mail.ru, [4]anuar.mukazhanov@gmail.com

Received 10 July 2018; accepted 15 October 2018; published 30 December 2018

Abstract. Kazakhstan now actively supports the development of entrepreneurship and conducts diversification of the economy. However, the recent crisis has changed the world market and business performance in the country has deteriorated significantly. The presented research studies the directions and reasons for the growth of costs. Based on a mass survey of entrepreneurs, the impact of production and transaction costs on the activities of businesses was assessed. Reducing administrative barriers should also reduce costs across the entire front line between government and business. However, in the process of decisions development on priority areas for reducing costs, evaluations of experts unite and lose coherence. Economic assessments turn into political ones, while the degree of consensus (concordance) of opinions is low. This limits the reliability of the final data and the possibility of their application. In this study, the consistency assessment was carried out using the concordance coefficient.

Keywords: entrepreneurship; business; production costs; transaction costs; survey; experts; consistency assessment; concordance; Kazakhstan

Reference to this paper should be made as follows: Petrenko, E.; Pizikov, S.; Mukaliyev, N.; Mukazhan, A. 2018. Impact of production and transaction costs on companies' performance according assessments of experts, *Enterpreneurship and Sustainability Issues* 6(1): 398-410. http://doi.org/10.9770/jesi.2018.6.1(24)
..

JEL Classifications: C81, C83

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

1. Introduction

For a long time, cost management in Kazakhstan was seen as an internal issue of enterprises, and the state's task was to create favorable conditions for economic activities. The free market and competition stimulate the business to obtain higher profit rates and should become the basis for increasing production efficiency.
The formation and development of Kazakhstan's business took place against the backdrop of an increase in commodity prices, which ensured the growth of the economy as a whole. Under such favorable conditions, Kazakhstani business was not focused on lean production, as well as state bureaucratic machine was not oriented to save state budget funds.

As a result, Kazakhstani enterprises operate at low productivity and spend more financial and material resources than business in the advanced countries of the world. The first wave of the crisis of 2007-2010 made the sanation of the most vulnerable places in the domestic economy, but a protracted recession did not ensured any significant increase in labor productivity and cost reduction (OECD 2017). The second wave of the crisis, which occurred in 2015, showed that the possibilities for savings are exhausted. From the local reduction of administrative barriers, it is necessary to move on to systemic work to prevent their occurrence and frontal cost reduction, including both reducing the administrative burden, and optimizing the cost structure according to the advanced regulatory level (Akorda.kz,2017).

In 2015, total expenses (excluding Corporate Income Tax) of businesses over 100 employees increased by 33% at once, while total expenses of small business grew up to 43% (CEO SURVEY 2016). The largest increase in the cost structure of large and medium-sized businesses occurred under the item "other expenses", which increased from 41.7% to 53.7% (+ 12%). In small business, “other expenses” reached 63.4% in 2015 with an increase of 9.7% over 6 years.

Other expenses consist of taxes, compulsory levies, rents, services of outside organizations (non-productive services), costs of bank loans, representation and hospitality, etc. Increasing “other expenses” reflects the strengthening of the administrative burden and deterioration of the institutional environment for doing business in Kazakhstan.

It should be noted that there is no systematic macroeconomic accounting of costs in Kazakhstan's statistics, which also indicates insufficient attention paid to cost analysis. Lack of reliable and comparable statistics makes impossible to determine the dynamics of costs and monitor them (Tvaronavičienė, Nesterova, Kováčik, 2017). Benchmarking is an important factor in improving production efficiency, but in this case even comparison with Kazakhstan indicators is impossible, since the costs by sectors are not determined on an ongoing basis.

In 2017, the authors participated in a large-scale national study, which examined various aspects of the development of Kazakhstani entrepreneurship and its costs. To assess the level of costs and analyze the current situation, combined research methods were applied, including and combining desk assessment, factor analysis, peer (expert) review, pilot study and others.

2. Methodology

Generally, business costs can be divided into production costs and transaction costs. Cost – monetized form of expenditure of different types of economic resources (raw materials, labor, fixed assets, services, financial resources), as well as related to the obligations and requirements of the state in the production and circulation of products and goods.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

(In business, cost is usually a monetary valuation of (1) effort, (2) material, (3) resources, (4) time and utilities consumed, (5) risks incurred, and (6) opportunity forgone in production and delivery of a good or service. All expenses are costs, but not all costs (such as those incurred in acquisition of an income-generating asset) are expenses.

Production costs - the costs related to the production of goods. In accounting and statistics they are reflected like prime cost (net cost). Include raw material costs, labor costs, etc.

Administrative costs (term is often used as a synonym for *Transaction costs*) are costs that are not directly involved in the production of goods, but are indirect costs to fulfill obligations and requirements *(established by government*) related to the collection and retrieval of information, the conclusion of transactions, contracts, contracts, etc. (Paneyah, 2001).

For purposes of this study of costs of the Kazakhstani businesses and their (costs) frontal decline (reduction), Standard Cost Model (SCM) is used, which allows to reduce the level state regulation as well as existing relations between business on one hand, and natural monopoly entities and the quasi-public sector on another hand.

Two groups of respondents were surveyed:
- Entrepreneurs (owners either top managers) who were asked to estimate the potential and real impact of costs;
- Specialists in finance and/or accounting to assess the level of growth (decrease) in costs and determine their priority in terms of their impact on the business.

The questionnaire for business owners and/or top managers is more evaluative, emotional in nature and is aimed to obtain not so much facts about the magnitude of costs, but more respondents' opinion on how these costs affect the efficiency (and sometimes the viability even) of business. The opinion of entrepreneurs reflects thus their intention to develop, manage or, on the contrary, close the business.

Financiers/accountants are the category of respondents, who best of all (sometimes even better than owners) have information about the amount of payments, their frequency, etc. Therefore, the questionnaire for them is aimed to obtain information about the types and magnitude of costs. Researchers admitted that to fill in this questionnaire might be necessary to apply to the accounting and financial documents, that this may require the work of more than one person, etc.

In both versions, the questionnaire contained open and closed questions The costs increasing was estimated a) as a percentage of increment; and b) depending on the Likert-type scale. The scale contained the following assessments:
- costs have not changed,
- rose up to 10%,
- increased up to 10-20%,
- increased up to 20-30%,
- increased more than 30%,
- I can not answer.

Thus, using the two above questionnaires, the authors obtained two sets of data on the same types of costs. Comparison of these groups of data quite clearly and reasonably shows the influence of various costs on the daily life of business. This approach allows the most complete reflection of the real situation at businesses in different industries, different dimensions (large/medium/small) and stages of development.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

The general number of businesses in Kazakhstan is 1.1 million (The Prime Minister of Kazakhstan, 2018)

The sample with a confidence level of 97% and an acceptable sampling error of 2% is 2963 businesses.
According to quotas, the sample included 2496 small and medium-sized enterprises and 281 large ones.
Quotas by industry were determined taking into account the share of enterprises in GDP, since costs are part of the finite cost of the product.
The actual sample obtained corresponds to the planned indicators and is completely representative.
The survey was conducted in 2017, as a result of which 2777 entrepreneurs and 2769 accountants turned out to be suitable for further processing.

The structure of business by industry in the manufacturing and service sectors is presented in Figures 1 and 2 below.

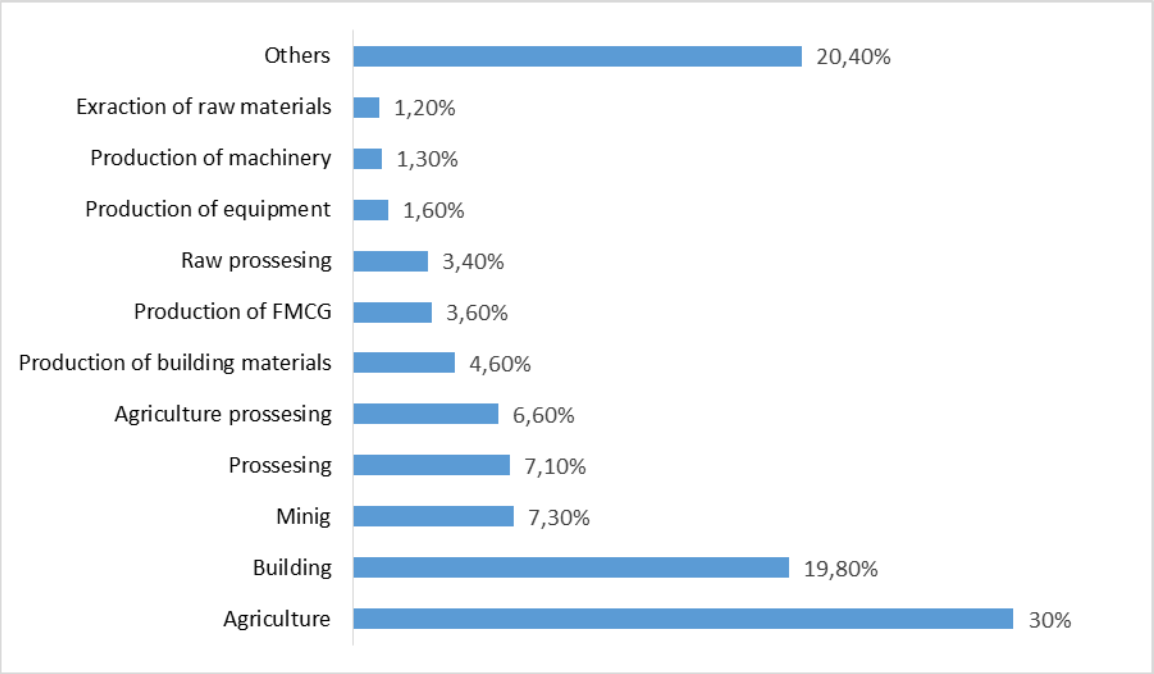


Figure 1. Sample structure by industry: Manufacturing sector
Source: personal elaboration

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

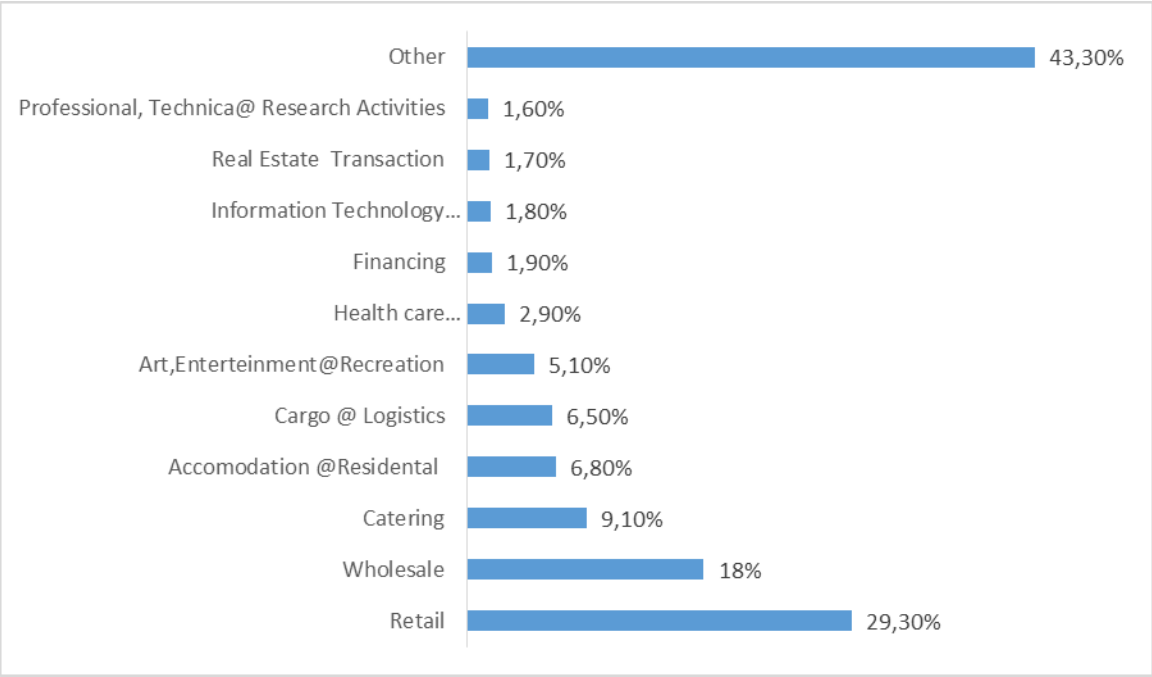


Figure 2. Sample structure by industry: Services sector
Source: personal elaboration

As can be seen from the presented diagrams, the most significant share of respondents in the manufacturing sector falls on businesses engaged in agriculture (30%) and construction (19.8%). As for service sector, retail and wholesale trade prevail there (29.1% and 18%).

A high proportion of "other" activities, both in production and in services, attract attention. In the author's opinion, this fact reflects the specifics of the development of entrepreneurship, which chooses various forms and directions of activity in the conditions of the "catch-up development" economy.

3. Analysis

Production costs were assessed in terms of their influence on the overall performance of business, its competitiveness and profitability. Various items of production costs were considered by their strength of the impact and the risk of significant losses and even bankruptcy. It was assumed that if businesses massively begin to feel a strong burden of cost growth, this creates a threat to the entire state economy and requires systemic state intervention and cost-cutting efforts by the entire front line.

The activity of any enterprise assume the consumption of raw materials, energy, payment of wages, social and pension insurance of employees, accrual of depreciation, as well as with a number of other necessary costs. All these costs are reimbursed through the sale of products (goods, services). These costs are production costs, or costs directly related to the production of goods or services.

The authors assumed that a critical increase in costs is 25% - if this value is exceeded, negative changes begin for the economy as a whole.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Respondents' opinions are subjective, but if they in total exceed the threshold, they represent a statistically significant public opinion of the business community.

The valuation was carried out for 18 items of production costs, in the context of industries and services. Also, the structure and dynamics of business costs of different size and stage of the life cycle were compared.
The increase in production costs associated with the purchase of raw materials, components has a strong impact on the business of almost half of the respondents (47,4%), of which a very strong influence is felt by 13.5%, and critical - by 2.8%. Insignificant influence is felt for 22.6% of respondents. These costs do not affect each third entrepreneur.
In accordance with the proposed approach, the authors singled out the share of organizations in which the costs increased by more than 25%. (Recall, such growth was defined as critical, capable of adversely affecting business activities) – Table 1.

Table 1. The share of organizations with a growth in production costs of more than 25%

№	Costs	Manufacturing Sector	Services Sector
1	Raw materials	48	33
2	Salary of production workers	31	23
3	Salary of auxiliary workers	18	16
4	Depreciation	37	20
5	Auxiliary materials	22	14
6	Social package for workers	15	11
7	Fuel	50	27
8	Transportation	38	22
9	Electricity	39	35
10	Heating	26	34
11	Water/Sewage	25	23
12	Trash	13	13
13	Bank payments	34	27
14	Communications	15	12
15	Lease, renting	18	11
16	Licenses	23	23
17	Taxes	32	37
18	Social payments	18	23

Source: personal elaboration

According to surveyed entrepreneurs, a significant problem for business development is primarily the growing prices for fuels, electricity, raw materials. A quarter to a half of the respondents both in manufacturing and services sectors named these costs as a serious obstacle in their current activities. 38% of the respondents in manufacturing businesses indicated high transportation costs. Businesses in the service sector noted an unfavorable level of taxes and payments, which, according to their assessment, is in the first place as a deterrent to the development of service entrepreneurship. Loans are also a common problem for industry and services (Figure 2).

Transaction costs are costs that do not relate directly to the production of products, but are associated with collecting and searching for all the information necessary for the activity, concluding various transactions, and etc.(Giriūnienė, Giriūnas, 2017). Transaction costs are barriers to doing business and its development, so resolving problems associated with transaction costs and reducing these costs will create a favorable business

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

climate and good conditions for the development of the business environment (Ketokivi, Mahoney, 2017; Narkunienė, Ulbinaitė, 2018)

The increase in such transaction costs, as the costs of property protection, does not affect business in the opinion of 54.8% of respondents. 28% of entrepreneurs believe that the influence is weak. 17.2% of respondents said about a more significant influence, while 3.8% only said they have a strong influence

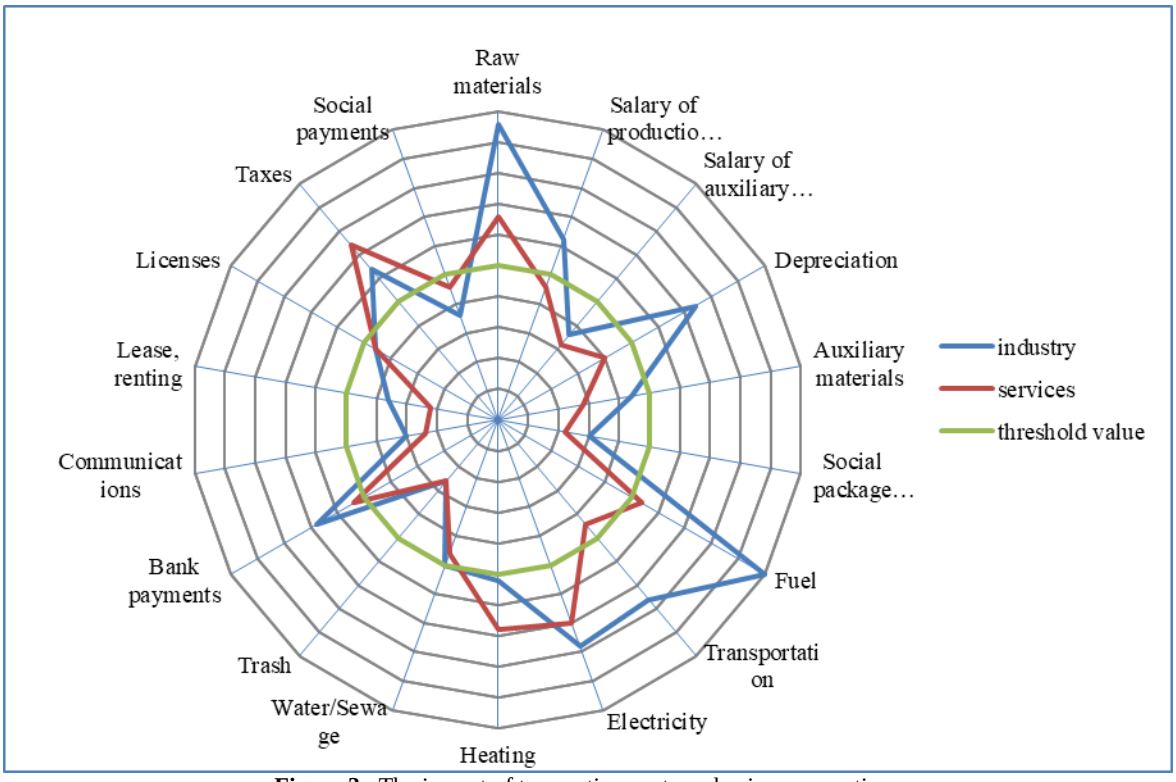


Figure 3. The impact of transaction costs on business operations
Source: personal elaboration

Entrepreneurs consider raising the salaries of the main staff like significant costs. Obviously, the increase in pay and the transition to a full social package is not accompanied by increased productivity and increased labor motivation of employees.

At the next stage of the analysis, the degree of influence of various cost items on the state of the business was ranked for each category of experts. Ranking the significance allowed to translate the statistical evaluation into a social one.

Since the main task of the national research was to improve the situation in Kazakhstani business through the adoption of new laws and regulations, the choice of priorities has not only economic but also political significance.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Improving the institutional environment requires significant resources, concentrated in a number of areas, possibly at the expense of others. The coordination of interests of various stakeholders in lobbying legislative reforms should be based on the agreed opinion of the beneficiaries. It was very important to correctly determine the cost items that have a key effect on the growth (decrease) in costs.

As a result of grouping, TOP-10 items of production costs and TOP-12 of the most significant items of transaction costs were singled out. Also, businesses were grouped according to belongings to the services sector or manufacturing sector.

Since the survey was conducted on two categories of experts - property owners (managers) and specialists (accountants, economists, financiers) - the rankings of these two groups were additionally allocated. The results of ranking are presented in Table 2.

Table 2. Ranking of costs by the degree of influence

№	Costs	Experts			
		Manufacturing		Services	
		Owners	Specialists	Owners	Specialists
	Production costs				
1	Raw materials	2	1	4	1
2	Salary of production workers	8	6	9	9
3	Depreciation	5	5	10	10
4	Fuel	1	9	5	8
5	Transportation	4	2	8	7
6	Electricity	3	4	2	6
7	Heating	9	3	3	4
8	Water/sewage	10	7	7	5
9	Bank payments, Loans	6	8	6	2
10	Taxes, other payments	7	10	1	3
	Transaction costs				
1	Certification	4	7	12	8
2	Fines	2	4	1	2
3	Legal (court) costs	12	3	5	3
4	Access to state procurements	3	6	11	9
5	Access to finance (loans)	1	5	4	5
6	Bribes to officials	5	10	8	10
7	Bribes to bank officers	6	11	9	11
8	Bribes to employees of enterprises that are subjects of natural monopolies	7	12	10	12
9	Security costs	10	8	7	4
10	Tax reporting	11	9	2	7
11	Reporting to government agencies (non-tax)	9	1	6	1
12	Payments for permits*	8	2	3	6

Source: Personal Elaboration

* Four types of payments are included here: 1 – government's permits, 2 – natural monopolist's permits, 3 – quasi state permits, 4 – inspections costs.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Expert opinions represent the cumulative assessment given by large number of respondents-representatives of Kazakh entrepreneurship and managerial specialists. They can be used to represent the interests of the whole national business and become the basis for making decisions on changing the legislation affecting the conditions of doing business in the whole country. In this regard, it is important to assess how consentaneous (concordant) the expert opinion is when combining the results of the questionnaire into the overall assessment. The task is of great applied value, since in practice, mass questioning and interviewing of various representatives of business are often used. According to author's estimates, up to 50 national polls of entrepreneurs are conducted annually in Kazakhstan, as well as about 200 polls at the regional level.

At the same time, an assessment of the consistency of opinions of different respondents is carried out for the first time in Kazakhstani science and practice.

The results of the assessment will help public organizations to determine the relevance of the requirements of various business groups and organizations, and researchers of the business environment - more accurately conduct surveys and reduce the cost of processing them. The assessment of the concordance of experts' opinions can be made in various ways, the best known of which is the coefficient of concordance (Concordance Coefficient, 2017). The authors used the following type of coefficient to calculate:

$$W = \frac{S}{\frac{1}{12}m^2(n^3-n)-m\sum T_i}$$

Where in $T_i = \frac{1}{12}\sum_{l=1}^{L_i}\left(t_l^3 - t_l\right)$ L_i - the number of links (types of repeating elements) in the evaluations of the *i-th* expert, t_l - the number of elements in the *l-th* bunch for the *i-th* expert (the number of repeating elements).

This formula was used to calculate the general concordance of the opinions of experts in their ranking of influence of production costs on the overall results of doing business. It was assumed that the presentation of a single assessment of influence of production costs would make it possible to seek decisions that could improve the conduct of business by all subjects of the general population.

When calculating the overall concordance of the ranked estimates of the impact of production cost items, the number of factors is n = 10, the number of experts is m = 4. The matrix of grades for assessing the concordance of experts is presented in Table 3.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Table 3. Matrix of the ranks of the concordance of all experts

Factors	Experts				Amount of ranks	d	d^2
	1	2	3	4			
x_1	2	1	4	1	8	-14	196
x_2	8	6	9	9	32	10	100
x_3	5	5	10	10	30	8	64
x_4	1	9	5	8	23	1	1
x_5	4	2	8	7	21	-1	1
x_6	3	4	2	6	15	-7	49
x_7	9	3	3	4	19	-3	9
x_8	10	7	7	5	29	7	49
x_9	6	8	6	2	22	0	0
x_{10}	7	10	1	3	21	-1	1
∑	55	55	55	55	220		470

Source: Personal Elaboration

Where

$$d = \sum x_{ij} - \frac{\sum\sum x_{ij}}{n} = \sum x_{ij} - 22$$

$$W = \frac{12S}{m^2(n^3 - n)}$$

где S = 470, n = 10, m = 4

$$W = \frac{12 \cdot 470}{4^2(10^3 - 10)} = 0.356$$

W = 0.356 says about weak concordance of expert's opinions.
The applied value of the weak link indicator, determined by the concordance coefficient, means that in different types of business, production costs affect overall efficiency with varying impact. Logically, this can be explained by the fact that business processes in different industries are not comparable. There are different types of costs and ways to reduce production costs in each industry.

To determine the nature of the differences, concordance coefficients for the opinions of entrepreneurs and specialists both in manufacturing and services sectors were calculated in the same way (Table 4).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

Similarly, the coefficients for transaction costs were also calculated. The assessment was made on the basis of the cumulative opinion of experts. Comparison between entrepreneurs and specialist also was done.

Table 4. Assessment of consistency of experts' opinions with the coefficient of concordance

Concordance coefficient	Experts		
	All (4)	Manufacturing sector (2)	Services sector (2)
Production costs	0.356 – weak concordance	0.6 – medium concordance	0.818– high concordance
Entrepreneurs (managers) in manufacturing and services	0.564 - medium concordance		
Specialists in manufacturing and services	0.533 - medium concordance		
Transaction costs	0.435 - weak concordance	0.472 - weak concordance	0.815 - high concordance
Entrepreneurs (managers) in manufacturing and services	0.409 - weak concordance		
Specialists in manufacturing and services	0.91 - high concordance		

Source: Personal Elaboration

The concordance coefficients demonstrate a low connection in the aggregate assessment (0.356) and high with a separate assessment of the opinions of manufacturing sector experts (0.6) as well as the service sector experts (0.818). It is obvious that production costs are formed to a greater extent under the specifics of production processes and are regulated by the cost management system within business.

Transaction costs calculated for 12 cost items also demonstrate a weak concordance among experts in the whole amount. A high concordance is observed in the assessments of experts in the service sector.

The authors believe that the business processes in the service sector are more similar than in the manufacturing sector. The nature of the service assumes a large share of personal labor. The Kazakhstani service sector is more dependent on rent, utility payments, taxes and credits. The change in the administrative burden on the service sector affects faster and with greater force. This is why concordance in services sector is much higher.

Consistency of opinions on the assessment of transaction costs is higher than for production costs. In the context of a worsening of the market situation, the administrative burden, expressed in transaction costs, increases with respect to the reduced production and is felt by all businesses regardless of industry.

Conclusions

For populist purposes, ranking is used often in determining of priority areas for protecting entrepreneurs' rights. The data obtained are given an unconditional estimate, without specifying the degree of concordance of opinions. This leads to a decrease in the quality of decisions.

Having considered the values of the concordance coefficients calculated to assess the consistency of the opinions of experts of various categories, a number of practical conclusions can be drawn.

When studying the factors that influence the development of the national business, a generalization of the assessments of experts is made without taking into account the consistency (concordance), which may actually be weak.

Researches of production costs should be conducted separately by industry. The results of examining the opinions of experts in the service sector give more consistent and correct opinions. Estimates of representatives of the service sector are more homogeneous.

Entrepreneurs and managers are less harmonized in their assessments, their conclusions are more political than objective. They reflect intentions, not an analysis of the situation. Experts rely on factual data, their attributive estimates are close to quantitative.

Due to the specifics of the Kazakhstan market, a number of production costs have more transactional nature rather than productive. The cost of fuel, electricity and water is formed on a monopolistic basis from quasi-public suppliers (Atameken.kz, 2017).The absence of market competition turns these costs into transaction fees and leads to the primary need for government regulation.
Based on the results of the analysis, 110 recommendations for reducing of costs were proposed, that require amendments to legislation. The number of proposed amendments to the legislative acts is 66, including:
- into Codes – 37
- into Laws - 29
- into regulations – 19
- into rules – 25
The total amount of costs assumed to be reduced after legislation changes adoption – KZT580,6 billion (USD 1,8 billion)

References

A draft of law for reducing the cost that impede business http://atameken.kz/ru/news/27353-u-kazahstanskih-predprinimatelej-est-rupor
CEO SURVEY 2016. https://forbes.kz/leader/ceo_survey_2o16

Chepurenko A. 2017. Entrepreneurial activity in post-socialist countries: methodology and research limitations, *Foresight and STI Governance* 11(3): 11–24. http://dx.doi.org/10.17323/2500-2597.2017.3.11.24

Concordance Coefficient: example calculation and formula. http://fb.ru/article/349619/koeffitsient-konkordatsii-primer-rascheta-i-formula-chto-takoe-koeffitsient-konkordatsii

Giriūnienė, G.; Giriūnas, L. 2017. Identification of the complex tax system evaluation criteria: theoretical aspect, *Journal of Security and Sustainability Issues* 7(2): 257-265. https://doi.org/10.9770/jssi.2017.7.2(7)

Ketokivi M., Mahoney J., Transaction Cost Economics as a Theory of the Firm, Management, and Governance in Oxford Research Encyclopedia of Business and Management October 2017 http://dx.doi.org/10.1093/acrefore/9780190224851.013.6

Narkunienė, J.; Ulbinaitė, A. 2018. Comparative analysis of company performance evaluation methods, *Entrepreneurship and Sustainability Issues* 6(1): 125-138. http://doi.org/10.9770/jesi.2018.6.1(10)

OECD Integrity Scan of Kazakhstan. Preventing Corruption for a Competitive Economy. 2017 http://www.oecd.org/countries/kazakhstan/oecd-integrity-scan-of-kazakhstan-9789264272880-en.htm

Paneyah E. 2011. Formal rules and informal institutions of their application in the Russian economic practice, *Journal of Economic Sociology* 2(4) https://ecsoc.hse.ru/en/2001-2-4/annot.html#doc_26594822

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(24)

State of the Nation Address by the President of the Republic of Kazakhstan Nursultan Nazarbayev, January 10, 2018. http://www.akorda.kz/en/addresses/addresses_of_president/state-of-the-nation-address-by-the-president-of-the-republic-of-kazakhstan-nursultan-nazarbayev-january-10-2018

The Prime Minister of Kazakhstan, Official website 2018; https://primeminister.kz/en/news/all/bakitzhan-sagintaev-o-sovmestnoi-rabote-s-npp-atameken-na-segodnya-sformirovana-splochennaya-komanda-16722

Tvaronavičienė, M.; Nesterova, K.; Kováčik, V. 2017. Energy security and long-term energy efficiency: case of selected counties, *Journal of Security and Sustainability Issues* 7(2): 349-357. https://doi.org/10.9770/jssi.2017.7.2(14)

Elena PETRENKO is Doctor of economics, professor, Plekhanov Russian University of Economic, Professor of the Department of Management Theory and Business Technologies, Moscow. Expert Consultant of the European Bank for Reconstruction and Development in Kazakhstan, Karaganda city. Research interests: modern management problems, entrepreneurship development, post-industrial economy manager, creative industries.
ORCHID ID: 0000-0001-6892-2392

Sergey PIZIKOV is graduate student. Founadion for Informational Support for Society Development East Kazakhstan, Ust-Kamenogorsk city. Research interests**:** Development and management of civil society, interaction with the state, monitoring of public services.
ORCID ID: 0000-0002-2527-1232

Nurlan MUKALIYEV is graduate student. Director, "VIMA" LLP, Astana city. Research interests: management of innovations, lean production, innovative entrepreneurship.
ORCID ID: 0000-0002-3710-7747

Anuar MUKAZHAN is graduate student Tsesnabank, Kazakhstan, Astana city. Research interests: blockchain, development of banking technologies, knowledge economy, management of network models, economic risks
ORCID ID: 0000-0001-7285-8995

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(25)

Publisher
http://jssidoi.org/esc/home

SOCIO-ECONOMIC SUSTAINABLE DEVELOPMENT AND THE PRECARIAT: A CASE STUDY OF THREE RUSSIAN CITIES*

Vyacheslav Volchik[1], Liudmila Klimenko[2], Oxana Posukhova[3]

[1,2,3] Southern Federal University,I105/42 Bolshaya Sadovaya str., 34406 Rostov-on-Don, Russian Federation

E-mails:[1] volchik@sfedu.ru; [2]lvklimenko@sfedu.ru; [3]belloks@yandex.ru

Received 20 March 2018; accepted September 10 2018; published 30 September 2018

Abstract.. Sustainable social and economic processes of the recent decades are characterized by the emergence of new phenomenon known as precarity and its new accompanying class known as the precariat. The precariat as a social class or social community is primarily associated with a factor of instability and insecurity of workers with flexible employment. This paper studies the precarity on the labor market for the socially-oriented professions in the three Russian metropolitan areas: Moscow, Kazan, and Rostov-on-Don. The paper searches for the causes of precarity of socially-oriented professions based upon the analysis of economic processes in the public sector, and of the reformers' rhetoric and its reflection in the discourses of the main actors about the goals and direction of the reforms. Socially-oriented professions are associated with the creation of benefits, which are very little associated with markets and in most cases belong to public or mixed goods. Our findings suggest that the reforms of Russian education and healthcare spheres are accompanied by large-scale institutional changes which resulted in bureaucratization, orientation toward achieving performance indicators not related to professional values, stagnation of incomes, inequality between regions, and instability of professional trajectories. We conclude that reducing the prestige of socially-oriented professions, the material well-being, along with instability, become the main factors of precarity.

Keywords: institutional changes; entrepreneurship; education; healthcare; precariat

Reference to this paper should be made as follows: Volchik, V.; Klimenko, l.; Posukhova, O. 2018. Socio-economic sustainable development and the precariat: a case study of three Russian cities, *Enterpreneurship and Sustainability Issues* 6(1): 411-428. http://doi.org/10.9770/jesi.2018.6.1(25)

JEL Classifications: O15, O43, J08

1. Introduction

* *The article is written with the assistance of Russian Science Foundation, Project № 16-18-10306*

The precariat has become a social reality. Many studies after the publication of the book Standing (2011) demonstrate that the phenomena that can be attributed to precariat and precarity are observed in almost all areas of employment (Kopycińska and Kryńska, 2016; Tvaronavičienė, Gatautis, 2017). It is necessary to understand the reasons for such wide distributors of precariat as a new social class or a new social community (Frase, 2013). In the context of this work, this paper focuses on the precariat as the new class of vulnerable adepts of the "gig economy", as well as the labor precarity of socially-oriented social groups in the conditions of Russian labor market. The phenomenon of precariat forces researchers to change approaches to analyzing employment, changing working conditions, and rethinking traditional models related to labor relations in both economic theory and sociology. The modern development of spheres where socially-oriented professionals are engaged is connected with large-scale reforms that involve radical institutional changes. However, institutional changes (at least in the short term) do not lead to the formation of stable equilibria and are increasingly characterized by deinstitutionalization, which is the cause of precarity (Dobbins et al., 2014).

The growth of the precariat is accompanied by a policy aimed at increasing the public-sector efficiency. There is a hybridization of economic relations (Gregory, 2016), but the change in the proportions between the private and public sectors and the introduction of competitive mechanisms occur asynchronously with the formation of sustainable effective institutions (Volchik and Posukhova, 2016; Štreimikienė et al., 2016; Vasylchak and Halachenko, 2016; Strielkowski et al., 2016a; Strielkowski et al., 2016b; Niño-Amézquita et al., 2017). This disjunction leads to instability of professional status, in particular, among socially-oriented professions.

The emergence and strengthening of precariat are associated with regulatory dysfunction. These dysfunctions stem from the belief that not only the structures of organizations can be consciously determined, but also market design can be successfully done. Design and pernicious self-confidence in this plan led to the destruction of social institutions, which, in particular, were responsible for the stability of employment. Precariat is a consequence of the lack of effective institutions for regulating emerging new social relations. Such institutions cannot be replaced by designing effective market mechanisms (Mirowski and Nik-Khah, 2017; Tvaronavičienė, 2018).

One important and paradoxical (at first sight) reason for the formation of the precariat is the desire for efficiency. Efficiency as a concept, although associated with intuitively accessible for each meaning, in fact there is a set of theories in economics that differ in complexity and not in homogeneity. In the ordinary sense (and most often in public discourse), efficiency is understood as the ratio of costs and results. In this context, efficiency is close to the notions of productivity and performance. Although there are also many unsolved research issues for the private sector and private goods, there are satisfactory answers about measuring and improving efficiency, productivity and performance. However, for other types of goods – public, mixed, club, trust, etc.

Trust and social solidarity cannot be replaced by competition and the pursuit of profit. But this does not mean that there should be no competition and utilitarian behavior, oriented to profit. It is all about the institutional limitations of utilitarian human activities and cultural and social contexts that must be considered in the light of historical heritage and experience (North, 1990, North, 2005). In addition, chronic underfunding of the social sphere in the period of radical market reforms led to the formation of significant shadow institutions and corruption mechanisms (Strielkowski and Weyskrabova, 2014; Čábelková and Strielkowski, 2015; Koudelková et al., 2015). Shadow relations in the sphere of education and health can be considered as compensatory mechanisms of adaptation to low official incomes.

For professional groups associated with the public sector, the pursuit of efficiency turned into an increase in bureaucratization, instability (related, inter alia, to an endless series of reforms) and the performance of previously uncommon functions. Professionals ceased to define goals and plan changes by passing these roles to managers (Lorenz, 2015, Lorenz, 2014, Lorenz, 2012). Here we face a very sensitive issue for the economic and managerial

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

sciences – the universality of recommendations for improving efficiency. Labor precarity of socially important professions is associated with changes of both technological and institutional nature. The identification of the causes and consequences of precarity is impossible without a detailed study of social and technological contexts (Brougham and Haar, 2017). Possible solutions to the problem of precarity can be reforms aimed at increasing the incomes of professions that are under threat of precarity. Why is the employment in the public sector increasingly drifting towards the precariat? The answer to this question depends both on an understanding of the nature of the precariat as a social phenomenon, and on the analysis of the processes taking place in the public sector over the past decades.

This paper is structured as follows: section 2 provides a comprehensive literature review. Section 3 outlines the methodology used in our study and describes the data obtained for this research including the origin, sampling frame and the scope of the population. Section 4 reports on the empirical results obtained in the course of this study and provides some discussions on these results. Finally, Section 5 concludes the paper providing closing remarks and policy implications.

2. Literature review

Precariat is formed wherever stable forms of employment are destroyed. The reason for this destruction is often institutional changes related to reforms and the adoption of new laws, as in the case of Spinhemland (Polanyi, 2002), and the introduction of new technologies or processes of globalization (Standing, 2012). Here it is necessary to stipulate that a flexible labor market is undoubtedly associated with an increase in economic efficiency, but provided that there are no significant restrictions on competition in this market. Is the labor market competitive in the public sector? And what is the nature of this competition? the answer to these questions provides understanding of the process of reforms aimed at optimizing and increasing the efficiency of the public sector. If we take a detailed look at the labor market in the public sector, it can be hardly concluded that it is competitive. For example, in the general education sphere, the state (or municipalities) is an absolute monopolist as an employer: out of 43,198 general educational institutions, the number of non-state institutions is only 717, which is only 1.6% (Ministry of Education, 2017). In such conditions, the dominant employer state (or municipal), subject to uniform regulatory documents on the organization and payment of labor, dictates the basic parameters and conditions of employment, which is difficult to call market competition.

If elements are introduced at the intra-organizational level, it should not be forgotten that public sector organizations are increasingly turning from specific organizations based on professionalism to bureaucratic organizations, where the power of administration and the achievement of exogenous non-market performance indicators dominate (Bezes et al, 2012).

Reforms in the public sector can be characterized as moving from the principle of corporate professionalism to the principle of economism. By “economism” one can identify a wide class of phenomena in deep-rooted social and political discourse associated with the adoption of basic principles for organizing the production of any economic benefits (private, public, mixed, etc.): market orientation, maximizing profits, cutting costs. This approach can also be described as econocraty (Earle, Moran, and Ward-Perkins, 2017) or managerialism (Taylor, 2007).

To trace the evolution of managerialism (economism) and, most importantly, to obtain a relevant understanding of these processes, we need to briefly address the issue of the genesis of institutions. Within the framework of the various economic currents of neo-institutionalism, the point of view dominates before the Austrian school that institutions arise as a result of collective actions (Hayek, 2012) (North, 1990). However, there are other explanations for the formation and evolution of institutions, for example, as the process of dissemination of collective beliefs and expectations in society (especially among the expert community and political elites), which

is the basis for the formation of new rules and measures of social and economic policy (Walliser, 2008). Such collective beliefs are formed on the basis of ideology or widespread scientific ideas and their implementation in public policy measures within the course of ongoing reforms.

Economization and managerialism (the term "managerialism" is used to characterize new management approaches to the provision of public services within civil service reform in the 1980s in the UK (Taylor, 2007)) in education leads to the introduction of practices that are borrowed from business (Redden and Low, 2012). And that is reflected in the emphasis on the quantitative indicators of the activities of educational institutions, different ratings and the results of unified testing systems (OGE, EGE). The practice of new public administration or new management in the public sector (in Russian scientific literature the translation as "new public administration" is more often used, but we consider this translation not entirely precise, and we will use the abbreviation New public management, NPM, in order not to multiply inaccuracies in the translation in the future) is usually associated with neoliberal market reforms in developed countries, originating in the 1980s (Lorenz, 2012, 2014).

The very term NPM (New public management) was first used in the work of Christopher Hood (Hood, 1991). Later, the concept of NPM was developed by Hood himself, as well as by his numerous followers. Proceeding from the market ideology, NPM declared simple principles: using a management style that is characteristic of the private sector; focus on performance indicators of the organization; great discipline in spending resources and their savings (O'Flynn, 2007). However, the widespread use of NPM methods in the public sector and in particular in education is linked to the processes of globalization, as well as to the fact that managerial ideas penetrated the discourse not only of conservative politicians, but also of socialists and social democrats (Verger and Curran, 2014).

The introduction of NPM was carried out and is still carried out under the banners of efficiency and de-bureaucratization. However, the practice of using NPM has shown basis for thinking: "Despite the fact that the organizational changes carried out as part of NPM reforms were aimed at increasing the efficiency of solving problems by separate quasi-autonomous state structures, this led to a paradoxical growth of the state apparatus and bureaucratization".

The reform of the school education institute has been carried out in Russia since 2011 and causes significant changes in the conditions and content of the teachers' work. New standards are adopted, new requirements are introduced to regulate the work of a teacher. The following changes can be emphasized: introduction of the basic and unified state examinations (Unified State Exam, USE; mandatory (obligatory) state examination); transition to fundamentally new federal state educational standards (FSES); the introduction of the professional standard "Teacher"; transition to electronic document management; updating forms and methods of teaching (interactive teaching aids, distance learning, etc.); the introduction of a new system of labor remuneration; inclusive education (Kulagina and Eliseeva, 2014). In addition, bureaucratic control is being strengthened and the number of teachers' administrative burdens is increasing.

On the other hand, the resource base for the modernization of the institute of education is shrinking. Official statistics record that over the past few years the expenditures of the consolidated budget of the Russian Federation on education are stagnating. And if in nominal terms for the period from 2013 to 2016 expenditures for the whole system of education increased from 2.9 to 3.2 trillion rubles, the aggregate amount of expenditures was growing at a faster rate. As a result, the share of expenditures in 2016 was reduced to 10%, and the gap in the dynamics of nominal spending reached 7.8 percentage points (Analytical Center, 2017).
It is institutional changes related to bureaucratization and stagnation of revenues that are key factors in the pre-categorization of teachers. Reforms in Russian health care are carried out and implemented under the slogans of increasing efficiency and optimization. In 2014-2015, regulatory acts were adopted, and according to them the

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

implementation of a set of measures to optimize the healthcare sphere began. Despite the positive goals of such reforms as improving the quality and availability of medical care, as a result, there was a reduction in the number of doctors, increased medical burden, the enlargement of medical institutions through mergers and reorganizations. Among the positive results of the reforms, the increase in wages and equipment of hospitals with high-tech equipment was declared. However, according to some estimates, starting from the 2010, the quality and availability of medical care decreased considerably.

In Russia, the optimization and improvement of the effectiveness of health care are conducted without a significant increase in funding. Traditionally, since the time of radical market reforms of the 1990s, health care in Russia has been very poorly financed, for example, public health expenditure in Russia in 2015 was only 3.4% of GDP, while in OECD countries the average indicator was 6.5% of GDP (OECD, 2017). Low financing combined with optimization-oriented reforms lead to an increase in instability among a professional group of doctors. Reorganization of health care facilities is also accompanied by an increase in bureaucratic burden, which is reflected in the growth of "paper work" activities, meant for doctors.

A series of economic crises, a decline in production, an increase in unemployment, and the instability of the labor market led to an increase in the flexibility of social and labor relations in Russian society when the principles of wage payment and organization of working time are unsustainable, often violating the employee's labor rights. In the sphere of hiring and moving employees, the rules and procedures for layoffs, transfer to the worst payment principles and working conditions are simplified. The deterioration of the social and labor situation of a large number of workers, the growth of their social vulnerability and the instability in the labor market in the scientific literature have been designated as the process of precarity (Standing, 2012; Foti, 2017; Hartung et al., 2017; Jenkins et al., 2017; Alonso et al., 2016). An important feature of the precariat is instability, which can be considered in the context of specific institutions that determine the formation of professional and social statuses.
Formation of the precariat in Russian conditions has its own peculiarities. These features are determined by the historical patterns of the evolution of the institutional environment (Maslov and Volchik, 2014; Oleinik, 2012; Klimina, 2016; Kirdina, 2014). Characteristics of the institutional environment are manifested in the formation of stable status and public opinion about certain characteristics of the profession, which is reflected in the specific perception of professional identity. Perception of professional identity by representatives of socially-oriented professions, considered in the context of this work, is an important factor in precariaty. In the Russian conditions, the influence of institutional inertia remains in the spheres of socially-oriented professions. The attitude in society towards education and health, as well as the status of teachers and doctors in Russian society, evolved from the Soviet attitude toward these professions. In the late Soviet period, in the 1980s of the last century, teachers and doctors had a low social status. in society there also was an ambivalent attitude, which, on the one hand, was based on recognition of the importance and social value of professions, and on the other, on the tacit acceptance of the fact of financing the social sphere 'by a residual principle'.

In the Russian society, representatives of socially-oriented professional groups are increasingly entering the precarity zone, in the context of this study they are teachers and doctors. Socially-oriented professional groups are engaged in areas that can be attributed to the public (state) sector of the economy. Therefore, the causes of precarity are related to the specifics of the functioning of Russian public sector organizations in the context of ongoing reforms.

Changes in the economy of socially-oriented professions, as well as in social status, are reflected in the perception of their identity by workers. Moreover, in Russian society the attitude to the profession of a teacher and a doctor is evolutionarily, but steadily changing. In the official rhetoric, socially-oriented profession is associated with the provision of services, and in this way accentuates the consumer approach. In other words, there is a drift of professions from education and health care to management or own business, where quantitative 'performance

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

indicators' (Janda et al., 2013) become the main criteria for success, which is reflected to a certain extent by the reflection of entrepreneurial activities in the media (Čábelková et al., 2015).

Russian reforms in the social sphere are carried out in line with the widely spread neoliberal economic policy. And although the rhetoric of the reformers can clearly not refer to the methods of neoliberalism, the measures of the current policy are very often traced back to the reforms carried out since the 1980s. The central idea of such reforms is the economic and market-oriented production of public goods. Therefore, the sources of precarity of socially-oriented professions are connected with the formation of flexible market mechanisms, and it does not always lead to significant economic results but has a destructive effect on the institutional structure and the reproduction (professions) of professionals in the public sector.

3. Methodology

This formulation of the problem determined the content of applied sociological research. The object of the study is the representatives of socially-oriented professions (school teachers, doctors) working in budgetary institutions of Russian megacities (cities with a population of more than 1 million people). The subject of the study is the perception of the degree of precarity of their labor by teachers and doctors. The survey time frame used in this study was March-May 2017. The geographical scope of our data were three Russian cities: Moscow, Rostov-on-Don, and Kazan. Moscow is the capital of the Russian Federation with a population of more than 12 million people. Rostov-on-Don is the largest city in the South of Russia, the administrative center of the Southern Federal District and the Rostov Region. The population of the city is 1.1 million people. Kazan is the capital of the Republic of Tatarstan within the Russian Federation. The population is 1.2 million people. According to the 2010 population census, Russians were 92% of the population of Moscow and 91% of those in Rostov-on-Don. In Kazan there live 49% of Russians, 48% - Tatars.

Our methods of research employed in this study were: 1) a mass survey on a standardized questionnaire; 2) deep semi-structured interviews. The sample of the mass opinion poll is quota-proportional, the statistical error of the survey does not exceed 4-5%. In total, 2054 school teachers who worked in Moscow, Rostov-on-Don and Kazan and 870 doctors from Moscow and Kazan took part in the survey. The sample of in-depth interviews is typological. 42 representatives of socially-oriented professions, 7 teachers and doctors in each of the three cities were interviewed within the study.

The sample of the survey of teachers was conducted as follows: The sample was collected in the Russian cities in the spring of 2017, 948 teachers of Moscow schools, 618 teachers of Rostov-on-Don and 488 teachers of Kazan were questioned with a standardized questionnaire. Our criteria for the selection of respondents were as follows:

- respondents' work place – city budget schools located in different parts of the city (30-35% in the center of the city, 70-65% in sleeping areas);
- gymnasiums, lyceums – from 10 to 15% of the total number of schools;
- secondary general education organizations (Municipal Budgetary Educational Institution Secondary School) - 85-90%.

In Moscow, female teachers accounted for 89% (in Russia there is a high degree of feminization of the pedagogical profession, about 85% of school teachers are women (Bondarenko et al., 2017)), 93% have higher education. Russians by nationality are 99% of respondents. Teach humanitarian subjects at school – 42% of teachers, natural science subjects – 40%, other subjects – 18%. In Rostov-on-Don, 94% of female teachers were interviewed, 95% of respondents with higher education. 97% of respondents are Russians by nationality. Teach humanitarian subjects at school – 50% of teachers, natural science subjects – 31%, other subjects – 19%. In Kazan, 82% of female teachers were interviewed, 97% of respondents with higher education. 51% of the teachers

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

surveyed are Tatars by nationality, 35% - Russians. Teach humanitarian subjects at school – 46% of teachers, natural science subjects – 35%, other subjects – 19%. Other parameters of the sample are presented in Table 1.

Table 1. Sampling of a sociological survey of teachers in Russian megacities.
Distribution of groups of respondents by age and work experience, %

Location	Age					Work experience				
	up to 30	31–40	41–50	51–60	over 60	up to 5	5–10	11–20	21–30	over 30
Moscow	19	24	35	20	19	16	13	30	31	10
Rostov-on-Don	22	23	36	16	22	18	11	25	33	13
Kazan	15	21	36	23	5	15	16	28	31	10

Source: Own results

A sample of the survey of doctors was conducted as follows: a standardized questionnaire surveyed 468 doctors working in Moscow and 402 doctors in Kazan. Our criteria for the selection of respondents were the following:

- the category of doctors in the study is people who have received a higher medical education in the relevant specialty and who work at a medical institution;
- respondents' work place – city budget hospitals located in different parts of the city (30-35% in the city center, 70-65% in the sleeping areas), in medical institutions of different profiles (therapeutic, surgical and traumatological, pediatric, preventive, etc.);
- work profile: therapists – 10-15%, pediatricians – at least 10%, surgeons – at least 5%, emergency doctors – at least 5%.

In Moscow, 39% of male doctors and 61% of female were interviewed. 98% of the respondents are Russians by nationality. 68% of those surveyed have a higher education, 29% have been trained in residency / internship, and 3% have a scientific degree. In Kazan, 39% of men and 61% of women participated in the study of the medical corps of medical institutions. Russians by nationality are 37% of respondents, Tatars - 62%. 67% of respondents have higher education, 28% - have been trained in residency / internship, 5% - have a degree.

Table 2. Sampling of a sociological survey of doctors of Russian megacities.
Distribution of groups of respondents by age and work experience, %

Location	Age					Work experience				
	up to 30	31–40	41–50	51–60	over 60	up to 5	5–10	11–20	21–30	over 30
Moscow	14	27	27	26	6	10	19	32	34	5
Kazan	11	27	31	24	8	12	15	33	32	8

Source: Own results

4. Empirical results and discussions

The results of our own sociological survey showed that no more than a quarter of the Russian teachers described pedagogical work as prestigious. Most of the teachers refer their work to usual (ordinary) professions: in Moscow 46% of respondents chose the answer option "not too prestigious, but it cannot be called as non-prestigious", 43% in Rostov-on-Don, and 50% in Kazan. About a quarter of Moscow and Kazan teachers and 40% of Rostov-on-Don respondents consider pedagogical work as not prestigious. Accordingly, almost half the number of Rostov teachers characterizes their profession as prestigious (25.3% in Moscow, 13% in Rostov-on-Don, and 22% in Kazan). (Table 3).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

Moscow doctors estimate their profession as prestigious more often than teachers: 33% of the doctors surveyed in Moscow, and 46% – in Kazan. More than half of the respondents in the capital of the Russian Federation and a third of the respondents in Kazan consider the profession of a doctor to be ordinary. And no more than 12% of doctors consider doctor's work to be non-prestigious (Table 3).

Table 3. Distribution of answers to the question "Do you think that in our time the profession of a teacher / doctor is prestigious?", %

	Teachers			**Doctors**	
	Moscow	Rostov-on-D	Kazan	Moscow	Kazan
yes, it's quite a prestigious profession	25	13	22	33	46
it's an ordinary profession, not too prestigious, but cannot be named un-prestigious either	**46**	**43**	**50**	**54**	**31**
this profession is clearly un-prestigious today	22	40	25	12	11
hard to answer	6	4	3	2	11

Source: Own results

Moscow teachers believe that the prestige of the teacher's profession in Russian society has increased over the past 5 years (34%). A much smaller number of Rostov (8%) and Kazan (18%) teachers agree to this. Respondents from provincial schools in most cases indicate a decrease in the prestige of teachers' work (25% in Moscow against 61% in Rostov-on-Don and 44% in Kazan). For the next 5 years, the same position towards school teachers' status in the society is predicted by one third of the respondents in the surveyed cities (31% in the first group, 39% in the second group and 28% in the third group), and the fifth part of teachers believes that the prestige of the profession will decrease (21 %: 20%: 26%, respectively). (Table 4).

Various assessments of the prestige of the profession by metropolitan (capital) and provincial teachers illustrate the growing processes of inequality between the capital and the regions. Moreover, inequality is increasingly affecting the institutional and social environment of Russian regions, helping to lock in the trend towards the precarity of socially-oriented professions.

Table 4. Distribution of answers to the questions "From your point of view, has the prestige of the profession of a teacher in Russian society changed over the past five years?", and "Will the prestige of the profession change in the next 5 years?", %

Answer options	**Teachers**			**Doctors**	
	Moscow	Rostov-on-D	Kazan	Moscow	Kazan
	during last 5 years				
increased	**34**	8	18	**36**	16
stayed the same	**36**	26	33	32	**45**
decreased	25	**61**	**44**	30	25
hard to answer	4	6	5	2	14
	within next 5 years				
will increase	29	16	23	**48**	26
won't change	**31**	**39**	**28**	20	**32**
will decrease	21	20	23	17	19
hard to answer	19	25	26	16	24

Source: Own results

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

A survey of doctors showed that in Moscow the prestige of their profession rather increased (36%) or did not change (32%). In Kazan doctors note the absence of fluctuations in the status of doctors more often (45%). Half of Moscow respondents are optimistic about the social evaluation of doctors' work, they believe that the prestige of the profession will increase within the next 5 years. Only a quarter of Kazan doctors agree to this, and a third of those polled in this city do not predict any special changes. (Table 4 above).

Teachers assessing the negative dynamics of the prestige of the profession on the whole also note that this is due to the indifference of society and the state to the problems of school. An important component of the professional well-being of representatives of socially-oriented professions is their perception of their social and economic situation. In a sociological survey, respondents were asked to assess the basic aspects of their lives according to a 5-point scale.

Empirical measurements showed that the satisfaction of teachers and doctors with these parameters is low in most cases. Against this background, the satisfaction of the capital's teachers and doctors in all positions is slightly higher than that of the provincial respondents. The integrated average in the group of teachers is 3.9 in Moscow, 3.2 in Rostov-on-Don and 3.4 in Kazan. In the segment of doctors this indicator is 3.7 in the Russian capital and 3.5 in Kazan.

Regarding individual positions, the teachers of the three cities are most satisfied with the way their life as a whole is going on (4.0 average points in the first group, 3.7 in the second group, 3.8 in the third group). The average grades of teachers are given to their health (3,9: 3,5: 3,4), housing conditions (3,8: 3,3: 3,8), life prospects (3,8: 3,2: 3,4 respectively). A noticeable difference is in the assessment of the satisfaction of Moscow teachers with the quality of leisure (3.8 in Moscow against 2.8 in Rostov-on-Don and 2.9 in Kazan) and the level of financial prosperity (wellbeing) (3.8 against 2.8 and 3, respectively). (Table 5).

Table 5. Distribution of answers to the question "Assess the various aspects of your life" according to a 5-point Likert scale (average scores)

	Teachers survey			**Doctors survey**	
	Moscow	Rostov-on-Don	Kazan	Moscow	Kazan
health	3,9	3,5	3,4	3,9	3,7
wellbeing	3,8	2,8	3,0	3,5	3,2
housing conditions	3,8	3,3	3,8	3,6	3,6
leisure	3,8	2,8	2,9	3,5	3,3
life prospects	3,8	3,2	3,4	3,7	3,6
how the life is overall	4,0	3,7	3,8	3,8	3,7

Source: Own results

Respondents note a decrease in the prestige of the profession of a doctor even in comparison with the Soviet period. The implementation of the program for the development of school education in Moscow affected the higher satisfaction of the capital's teachers with their financial situation during recent years. The results of the survey showed that the majority of the three megacities describe their economic well-being more as good than bad (52% in the Russian capital, 46% in Rostov-on-Don, and 42% in Kazan). At the same time, 26% of school teachers estimate their prosperity to some extent as unsatisfactory in Moscow against 43% in Rostov-on-Don, and 27% in Kazan. (Table 5).

It should also be noted that due to the deterioration of the economic situation in the country and a decrease in purchasing power, there is deterioration in teachers' satisfaction with their financial situation this year. In particular, Moscow teachers in 39% of cases estimated their prosperity as good 2-3 years ago, whereas this year the estimate is almost half of that (23%). In the Rostov segment, there is also a decrease in satisfaction (from 18%

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

- 2-3 years ago to 11% - at the present stage). In the capital of the Republic of Tatarstan, the number of respondents who assess their financial situation as "good" has not almost changed (34% 2-3 years ago and 31% this year). But if you look at the other side of the scale, you can see that 1,5 times more teachers in Kazan estimate their wealth as "rather bad than good" this year (25%) than a few years ago (17%). The answers of Moscow and Rostov teachers also show the difference in these positions by about 10% in the direction of deterioration. (Table 6).

The assessment of their financial situation by doctors is also a difference depending on the place of residence and the time period. But the interviewed doctors on the average estimate their own prosperity lower than the teachers.

Table 6. Distribution of answers to the question "Try to assess your financial situation". Survey of teachers, %

	Good	Rather good than bad	Rather bad than good	Bad
	Moscow			
2-3 years ago	39	44	14	3
current year	23	52	24	2
in 2-3 years	30	47	17	6
	Rostov-on-Don			
2-3 years ago	18	53	22	7
current year	11	46	34	9
in 2-3 years	19	42	30	10
	Kazan			
2-3 years ago	34	45	17	4
current year	31	42	25	2
in 2-3 years	41	39	17	3

Source: Own results

Inside the professional segment, Moscow doctors are less satisfied than the doctors of Kazan. Only 10% of Moscow respondents rated their financial situation this year as "good", the percentage of similar answers regarding the position "2-3 years ago" is 2.5 times higher. Most of the doctors of state hospitals in Moscow characterize their financial situation "rather good than bad" (59%). In the nearest future, in Moscow the interviewed doctors do not expect an increase in their income level. (Table 7). In Kazan, the share of positive assessments of doctors in relation to their income is somewhat higher and is 24% this year, and 25% 2-3 years ago. From 42% to 45% of the surveyed doctors speak of a rather good financial situation now and in the recent past. But the Kazan subgroup has a higher percentage of respondents who describe their financial situation as "rather bad than good" (29% and 27%, respectively). Most respondents do not also predict significant changes in the level of payment for their labor. (Table 7).

Table 7. Distribution of answers to the question "Try to assess your financial situation", Survey of doctors, %

	Good	Rather good than bad	Rather bad than good	Bad
	Moscow			
2-3 years ago	25	59	13	3
current year	10	65	20	5
in 2-3 years	13	67	12	8
	Kazan			
2-3 years ago	25	42	29	4
current year	24	45	27	4
in 2-3 years	27	44	25	4

Source: Own results

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

The unsatisfactory financial situation of doctors and teachers makes the phenomenon of part-time work significant. If one looks at the indicators of purchasing power of the interviewed representatives of socially-oriented professions, you can see that the majority of respondents (with the exception of Rostov-on-Don) can afford to buy things of durable use (TV, refrigerator) when buying on credit (from 29% up to 45% of respondents). The second is the answer to "money is enough for food and clothing, but the purchase of durable goods is a problem" (from 25% to 43% of all groups). The lowest purchasing power is recorded in the segment of Rostov teachers, where one third of respondents note that buying clothes causes them difficulties. And Moscow teachers and doctors demonstrate higher consumer power. (Table 8).

The decrease in the respondents' assessments of their material well-being over the last 2-3 years coincides with the deepening of reforms aimed at optimizing and increasing the efficiency of health and education spheres. The state policy in these spheres is realized with the use of target development indicators, for the achievement of which the effectiveness of institutions and organizations functioning is assessed. However, the use of indicators and metrics leads to long-term institutional dysfunctions (Muller, 2018) and, in particular, to an increase in precarity of socially-oriented professions.

Table 8. Distribution of answers to the question: "What types of purchases can you afford?", %

	Teachers survey			**Doctors survey**	
	Moscow	Rostov-on-Don	Kazan	Moscow	Kazan
money is enough for food, but buying clothes causes difficulties	9	**33**	9	**12**	2
money is enough for food and clothing, but the purchase of durable goods (TV, refrigerator) is a problem	**25**	**43**	**33**	**27**	**32**
we can afford to buy things of durable use when buying on *credit*	**45**	**14**	**38**	**29**	**46**
we can easily buy things of durable use with our *own money*, but it is difficult to purchase really expensive things, for example, a car	**18**	8	**14**	**27**	**14**
we can afford quite expensive things – an apartment, a summer residence and much more when buying on *credit*	3	1	5	4	5
we can afford quite expensive things – an apartment, a summer residence and many other things with our *own money*	0	1	1	1	1

Source: Own results

In the conditions of reforming the spheres of education and healthcare, and a series of economic crises, Russian teachers and doctors are entering the precarity zone. This is manifested in the worsening of the situation with respect to the social and labor rights of workers, when social obligations are not being fulfilled, the work load is not growing, and not accompanied by a rise in wages (Bobkov et al., 2014). According to international research, Russian teachers work more than the average for OECD countries. Their working week exceeds 46 hours, which is 8 hours longer than the working week on average. The teaching is given almost 23.5 hours in Russia, which exceeds the average load in the OECD (20 hours). Moreover, Russian teachers spend much more time on general administrative work.
The materials of the all-Russian study of medical workers conducted by the specialists of the Academy of Labor and Social Relations in 2016 also show that "many doctors and nurses, in addition to working at their main job, earn something at other places (...), taking into account all forms of employment the share of employees working more than 60 hours per week is 41 per cent. Every third respondent works from 41 to 60 hours and only 27 percent says that the actual duration of their work week is up to 40 hours" (Rosstat, 2017).

The studies of doctors and patients conducted by the scientists of the Financial University under the Government of the Russian Federation in 2012 and 2014 recorded a negative assessment of the planned reforms on the part of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

heads of public health institutions and ordinary citizens. And later, these negative forecasts are confirmed when there is a noticeable increase in pay, while the quality of medical services remains unchanged or decreases. The main reason for these phenomena, according to the results of this study, is a further reduction in the amount of budgetary allocations with low effective demand from the population (Alexandrova, 2017).

Empirical measurements within the framework of our research show that in the capital and in large provincial cities the degree of the work precarity of socially-oriented professional groups is different.

In Moscow, from 36% to 46% of teachers indicate an increase in workload. While in Rostov-on-Don, from 64% to 76%, and in Kazan, from 65% to 81% of teachers report an increase in the volume of their work. Moscow and Kazan teachers most often note the growth of work on the preparation and conduct of lessons and the increase in the burden of extracurricular work. Rostov teachers often point to a significant increase in administrative workload, filling out a different kind of reporting. (Table 9).

Table 9. Distribution of answers of respondent groups to the question "How has your workload changed over the past 1-2 years?", Survey of teachers, %

Workload	Moscow			Rostov-on-Don			Kazan		
	decreased	didn't change	increased	decreased	didn't change	increased	decreased	didn't change	increased
Work on preparation and conduct of lessons (mastering Federal State Educational Standard, new forms and methods of teaching)	13	40	**46**	3	27	**70**	2	17	**81**
Administrative load, reporting	8	**56**	36	3	21	**76**	1	31	**68**
Individual work with students	4	**58**	38	3	31	**66**	3	32	**65**
After-class workload (educational, creative, sports and other events)	6	**54**	40	6	30	**64**	1	29	**70**

Source: Own results

The introduction of new duties to the teachers occurs gradually and is perceived by them as a permanent process. Therefore, teachers perceive an increase in the workload as a self-evident thing. Our surveys of medical workers reveal that in Moscow and Kazan, most doctors record an increase in workload over the past 1-2 years. Most of all, the volume of official duties, tasks performed increase (80% in the first group and 67% in the second group). The growth of the administrative workload, the filling of accounts are noted by 57% of Moscow doctors and by 78% of Kazan doctors. Doctors point out that the increase in workload is, in particular, related to the process of ongoing reforms. A larger number of doctors in Moscow than in Kazan have noted an increase in the work load, which is not related to their job duties (66% vs. 46%). (Table 10).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

Table 10. Distribution of answers of respondent groups to the question "How has your workload changed over the past 1-2 years?", Survey of doctors ,%

Answer options	Moscow			Kazan		
	decreased	didn't change	increased	decreased	didn't change	increased
performance of duties, scope of tasks performed	2	18	**80**	1	32	**67**
administrative load, reporting	0	43	**57**	2	20	**78**
activities not related to official duties	2	32	**66**	1	53	**46**

Source: Own results

In our study, representatives of socially-oriented professions were separately asked how much they were concerned about the various manifestations of precarity.

Materials of a mass survey of city teachers have showed that school teachers are most concerned about the risks of increasing workload without wage growth (71% in Moscow, 84% in Rostov-on-Don, 73% in Kazan) and job losses (78% : 62%: 49%). The teachers surveyed are concerned about the risks of reducing or delaying wages (58%: 48%: 41%). Another 55% of Moscow, 41% of Rostov-on-Don and 35% of Kazan teachers are afraid of forced transition to part-time work. (Table 11).

Table 11. Distribution of answers of respondent groups to the question "How much do you currently worry about the following professional risks?", Survey of teachers, %

Professional risks	Moscow				Rostov-on-Don				Kazan			
	not worried at all	rather not worried	rather worried	worried a lot	not worried at all	rather not worried	rather worried	worried a lot	not worried at all	rather not worried	rather worried	worried a lot
Reduction or delay in wages	24	18	**36**	**22**	24	27	**29**	**19**	30	28	**23**	**18**
Forced transition to part-time work	15	30	**31**	**24**	32	27	**26**	**15**	33	33	**20**	**15**
Increase in workload without increasing wages	9	20	**36**	**35**	4	13	**34**	**50**	12	15	**34**	**39**
Loss of work	6	15	**25**	**53**	15	23	**25**	**37**	22	29	**18**	**31**

Source: Own results

As for medical workers, the results of our study showed that Moscow doctors are much more worried about the risks of precarity than the doctors of Kazan, and also the segment of the teachers in general. The overwhelming majority of the doctors working in budgetary medical institutions in Moscow and Kazan are afraid of an increase in the work load without an increase in salary (95% in the first group and 63% in the second group). Another 89% of Moscow and 57% of Kazan doctors are concerned about the risks of job loss. Prospects for reductions or delays in wages raise fears among 89% of doctors in the Russian capital and half as many doctors in Kazan (43%). Another two-thirds of the respondents in the first group are concerned with the risks of shifting to a part-time/week job, and half of the number of concerned in the second group. (Table 12).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

Table 12. Distribution of answers of respondent groups to the question "How much do you currently worry about the following professional risks?" Survey of doctors ,%

Professional risks	Moscow				Kazan			
	not worried at all	rather not worried	rather worried	worried a lot	not worried at all	rather not worried	rather worried	worried a lot
Reduction or delay in wages	3	9	**32**	**57**	27	31	**22**	**21**
Forced transition to part-time work	7	17	**38**	**37**	31	40	**20**	**10**
Increase in workload without increasing wages	1	4	**41**	**54**	19	18	**34**	**29**
Loss of work	3	7	**32**	**57**	20	24	**34**	**23**

Source: Own results

The majority of the interviewed school teachers and doctors do not agree that the state effectively solves the social and economic problems of teaching, and provincial teachers express more critical assessments. Among the teachers' corps in Moscow, this figure is 53%, compared with 87% in Rostov-on-Don and 84% in Kazan. In the segment of doctors in the Russian capital, the part of dissenters is 59% and 85% in Kazan. (Table 13).

Table 13. Distribution of answers of respondent groups to the question "How much do you agree with the statement that the state effectively solves the social and economic problems of teaching?", Survey of teachers, %

	Moscow				Rostov-on-Don				Kazan			
	totally disagree	rather disagree	rather agree	totally agree	totally disagree	rather disagree	rather agree	totally agree	totally disagree	rather disagree	rather agree	totally agree
teachers	**18**	**35**	33	15	**50**	**37**	11	2	**32**	**52**	16	0
doctors	**22**	**37**	33	7					**32**	**53**	13	2

Source: Own results

Interviewed teachers and doctors in case of violation of their labor rights (growth of unpaid workload, reduction / delay of wages, loss of work) have a rather passive position. Nothing will be done by 49% - 64% of the respondents in all groups (Tables 14-15). Against this background, teachers are most often focused on handling complaints to the authorities (from 59% to 61% of respondents in the three cities). From 63% to 91% of the school teachers from different cities are not ready to participate in political actions, apply to the judiciary, or the mass media. (Table 14).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(..)

Table 14. Distribution of answers of respondent groups to the question "How will you act in case of violation of your labor rights (growth of unpaid work, reduction / delay of wages, loss of work)?", Teacher survey, %

Answer options	Moscow		Rostov-on-Don		Kazan	
	rather yes	rather no	rather yes	rather no	rather yes	rather no
apply to the authorities	**59**	41	41	**59**	39	**61**
contact the media (newspapers, TV)	30	**70**	13	**87**	9	**91**
file lawsuits with the judiciary	37	**63**	27	**73**	32	**69**
participate in public organizations to protect the rights	37	**63**	41	**59**	38	**62**
participate in political actions and demonstrations	15	**85**	13	**87**	16	**84**
do nothing	38	**62**	39	**61**	52	**49**

Source: Own results

Medical workers in Moscow's budgetary institutions demonstrate a greater willingness to assert their rights in comparison with doctors from Kazan. 74% of Moscow doctors apply to the authorities in case of violation of their labor rights against 32% of Kazan specialists. 57% of the respondents of the first group and 31% of the second one expresses the willingness to participate in the activities of public organizations to protect their rights. Regarding other forms of protection of the rights (media, political actions, court), the indicator of readiness to use them does not exceed 45%. (Table 15).

Table 15. Distribution of answers of respondent groups to the question "How will you act in case of violation of your labor rights?", Survey of doctors, %

Answer option	Moscow		Kazan	
	Rather yes	Rather no	Rather yes	Rather no
apply to the authorities	**74**	26	32	**69**
contact the media (newspapers, TV)	28	**72**	15	**86**
file lawsuits with the judiciary	45	**55**	36	**64**
participate in public organizations to protect the rights	**57**	43	31	**69**
participate in political actions and demonstrations	23	**77**	7	**93**
do nothing	36	**64**	44	**56**

Source: Own results

Conclusions

Overall, one can see that labor precarity of socially important professions becomes a manifestation of very important trends in socio-economic development, not only in Russia, but also in other countries. The most significant social phenomena associated with precarity can be the following: strengthening regional disparities (mainly between the center and regions), low prestige of socially-oriented professions, low wages, corporate insecurity of employees in front of the administration of organizations and institutions.

Under Russian conditions, socially-oriented professions are associated with undiminished professional risks. Reforms, meant to improve the financial position of professional groups of doctors and teachers, are perceived rather negatively by the representatives of these groups. This paradox is due to the fact that reform is often carried out on the basis of the mechanical achievement of targets in the pursuit of mythical efficiency without taking into account the professional characteristics, values, and opinions of public and professional associations.

One of the consequences of reforms in the Russian public sector is the growing disparity between professional groups in different regions. Based on the analysis of qualitative and quantitative data, it can be concluded that in the capital and large provincial cities, representatives of socially-oriented professional groups are subject to precarious labor in varying degrees.

It can be concluded that the attitude to the problems of health and education is characterized by a certain cynicism in the Russian society. On the one hand, there is an understanding that education and health care are underfunded, subject to avalanche-like bureaucratization, and lag behind development levels not only from developed countries but also from many developing countries. On the other hand, there is also a strange consensus in society that the problems in education and healthcare concern only the actors of this sphere, so, no one is ready to violate the status quo in relation to doctors, teachers, professors. Perhaps this is a consequence of the ideological framework of neoliberalism: once the actors in the sphere of education choose their profession, their position is the problem of finding consensus within the framework of contractual relations with the employer. And although this point of view has a rather serious ideological and even theoretical basis, it seems incomplete and even erroneous. Therefore, precarity studies are needed to focus on the negative consequences of reforms in the areas of socially-oriented professions. Understanding these problems is an important step towards creating conditions favorable for overcoming negative trends not only in Russian but also worldwide.

Acknowledgements

The article is written with the assistance of Russian Science Foundation, Project № 16-18-10306.

References

Alonso, A.; Ferreira, S.; Alonso, D. 2016. Middle Class Evolving to Precariat: Labour Conditions for the 21st Century. Social Work & Society. http://www.socwork.net/sws/article/view/464

Bezes, P.; Demazière, D.; Le Bianic, T.; Paradeise, C.; Normand, R.; Benamouzig, D.; Evetts, J. 2012. New public management and professionals in the public sector. What new patterns beyond opposition?. *Sociologie du travail 54*:e1-e52. http://doi.org/10.1016/J.SOCTRA.2012.07.001

Bobkov V.; Csoba J.; Herrmann P. (eds.) 2014. Labour Market and Precarity of Employment: Theoretical Reflections and Empirical Data from Hungary and Russia. Bremen: Wiener Verlag fuer Sozialforschung.

Brougham, D.; Haar, J. 2017. Employee assessment of their technological redundancy. *Labour & Industry: A Journal of the Social and Economic Relations of Work* 27(3): 213–231. http://doi.org/10.1080/10301763.2017.1369718

Čábelková, I.: Strielkowski, W.; Mirvald, M. 2015. Business influence on the mass media: a case study of 21 countries. *Transformation in Business & Economics* 14(1): 65-75.

Čábelková, I.; Strielkowski, W. 2015. Tax revenue and morale: a case study of the Czech Republic. *International Journal of Economic Research 12*(1): 23-35.

Dobbins, T.; Plows, A.; Lloyd-Williams, H. 2014. 'Make do and mend' after redundancy at Anglesey Aluminium: Critiquing human capital approaches to unemployment. *Work, Employment & Society* 28(4): 515-532. https://doi.org/10.1177/0950017013491454

Earle, J.; Moran, C.; Ward-Perkins, Z. 2017. Econocracy, Vol. 1, Manchester University Press.

Frase, P. 2013. The Precariat: A Class or a Condition? *New Labor Forum* 22(2):11–14. http://doi.org/10.1177/1095796013482888

Gregory, C. 2016. From public policy to pure anthropology: A genealogy of the idea of the hybrid economy. In Sanders W. (ed.). Engaging Indigenous Economy: Debating diverse approaches (pp. 29-42). Australia: ANU Press.

Hartung, C.; Barnes, N.; Welch, R.; O'Flynn, G.; Uptin, J.; McMahon, S. 2017. Beyond the academic precariat: a collective biography of poetic subjectivities in the neoliberal university. Sport. *Education and Society* 22(1): 40–57. http://doi.org/10.1080/13573322.2016.1202227

Hayek, F. A. 2012. The Fatal Conceit : the Errors of Socialism. University of Chicago Press.

Hood, C. 1991. A public management for all seasons? *Public administration 69*(1): 3-19. http://doi.org/10.1111/j.1467-9299.1991.tb00779.x/full

Janda, K.; Rausser, G.; Strielkowski, W. 2013. Determinants of Profitability of Polish Rural Micro-Enterprises at the Time of EU Accession. *Eastern European Countryside* 19:177-217. https://doi.org/10.2478/eec-2013-0009

Jenkins, K.; Charteris, J.; Bannister-Tyrrell, M.; Jones, M. 2017. Emotions and Casual Teachers: Implications of the Precariat for Initial Teacher Education. *Australian Journal of Teacher Education* 1:162–179. http://doi.org/10.14221/ajte.2017v42n12.10

Kirdina, S. 2014. Institutions and the Importance of Social Control in a Nation's Development. *Journal of Economic Issues*, 48(2): 309–322. http://doi.org/10.2753/JEI0021-3624480204

Klimina, A. 2016. The Role of Culture, Historicity, and Human Agency in the Evolution of the State: A Case Against Cultural Fatalism. *Journal of Economic Issues* 50(2):557–565. http://doi.org/10.1080/00213624.2016.1179064

Kopycińska D., Kryńska E. 2016. The precariat in the labour market in Poland – social and economic aspects. *Journal of International Studies* 9(2):79-89. http://doi.org/10.14254/2071-8330.2016/9-2/5

Koudelková, P., Strielkowski, W., Hejlová, D. (2015). Corruption and system change in the Czech Republic: Firm-level evidence. *DANUBE: Law and Economics Review, 6*(1), 25-46. https://doi.org/10.1515/danb-2015-0002

Kulagina, E. V.; Eliseeva, M. A. 2014. Schools' pedagogical staff resources at the stage of education modernization: experiences of Moscow, Russia, and developed countries. *Sociological Studies 4*(4):111-121.

Lorenz C. 2015. The Metrification of 'Quality'and the Fall of the Academic Profession. Oxford Magazine 355: 7–11.

Lorenz, C. 2012. If You're So Smart, Why Are You under Surveillance? Universities, Neoliberalism, and New Public Management. *Critical Inquiry* 38(3):599–629. http://doi.org/10.1086/664553

Lorenz, C. 2014. Fixing the Facts the Rise of New Public Management, the Metrification of Quality and the Fall of the Academic Professions. Moving the Social 52: 5–26. http://doi.org/10.13154/mts.52.2014.5-26

Maslov, A.; Volchik, V. 2014. Institutions and Lagging Development: The Case of the Don Army Region. *Journal of Economic Issues* 48(3):727–742. http://doi.org/10.2753/JEI0021-3624480307

Mirowski, P.; Nik-Khah, E. 2017. The Knowledge We Have Lost in Information. Oxford University Press.

Muller, J. 2018. The Tyranny of Metrics. Princeton University Press.

Niño-Amézquita, J.; Dubrovsky, V.; Jankurová, A. 2017. Innovations and competitiveness in regional development: a comparison of Latin America, Europe, and China, *Czech Journal of Social Sciences, Business and Economics* 6(1):28-36. http://doi.org/10.24984/cjssbe.2017.6.1.4

North, D. C. 1990. Institutions, Institutional Change and Economic Performance. Cambridge: Cambridge University Press.

North, D. C. 2005. Understanding the Process of Economic Change. Princeton: Princeton University Press.

O'Flynn, J. 2007. From new public management to public value: Paradigmatic change and managerial implications. *Australian journal of public administration 66*(3):353-366. http://doi.org/10.1111/j.1467-8500.2007.00545.x/full

Oleinik, A. 2012. Institutional Transfers in the Russian System of Higher Education: A Case Study. *Journal of Economic Issues* 46(4):881–908. http://doi.org/10.2753/JEI0021-3624460403

Polanyi K. 2002. The Great Transformation: The Political and Economic Origins of Our Time. Saint-Petersburg: Aleteya Publishing

Redden, G.; Low, R. 2012. My school, education, and cultures of rating and ranking. *Review of Education, Pedagogy, and Cultural Studies 34*(1-2): 35-48. https://doi.org/10.1080/10714413.2012.643737

Standing, G. 2011. The Precariat. The New Dangerous Class. London: Bloomsbury, 198 p

Standing, G. 2012. The Precariat: From Denizens to Citizens? *Polity 44(4):588–608*. http://doi.org/10.1057/pol.2012.15

Štreimikienė, D.; Strielkowski, W.; Bilan, Y.; Mikalauskas, I. 2016. Energy dependency and sustainable regional development in the Baltic States: A review. *Geographica Pannonica 20*(2):79-87. https://doi.org/10.5937/GeoPan1602079S

Strielkowski, W.; Lisin, E.; Tvaronavičienė, M. 2016a. Towards energy security: sustainable development of electrical energy storage. *Journal of Security & Sustainability Issues 6*(2):235-244. https://doi.org/10.9770/jssi.2016.6.2(4)

Strielkowski, W.; Tumanyan, Y.; Kalyugina, S. 2016b. Labour market inclusion of international protection applicants and beneficiaries. *Economics and Sociology* 9(2):293-302 https://doi.org/10.14254/2071-789X.2016/9-2/20

Strielkowski, W.; Weyskrabova, B. 2014. Ukrainian Labour Migration and Remittances in the Czech Republic. *Tijdschrift voor economische en sociale geografie 105*(1):30-45. https://doi.org/10.1111/tesg.12052

Taylor, I. 2007. Discretion and control in education: The teacher as street-level bureaucrat. *Educational Management Administration & Leadership 35*(4):555-572. https://doi.org/10.1177/1741143207081063

Tvaronavičienė, M. 2018. Preconditions of sustainable entrepreneurship: estimating of Brexit scenarios' impact on macroeconomic environment. *Polish Journal of Management Studies* 17 (2): 222-234 https://doi.org/10.17512/pjms.2018.17.2.19

Tvaronavičienė, M; Gatautis, R. 2017. Peculiarities of income distribution in selected countries, Economics and Sociology 10(4): 113-123. https://doi.org/10.14254/2071-789X.2017/10-4/9

Vasylchak, S.; Halachenko, A. 2016. Theoretical basis for the development of resort services: regional aspect. *International Economics Letters* 5(2):54-62. http://dx.doi.org/10.24984/iel.2016.5.2.3

Verger, A.; Curran, M. 2014. New public management as a global education policy: its adoption and re-contextualization in a Southern European setting. *Critical Studies in Education 55*(3):253-271. https://doi.org/10.1080/17508487.2014.913531

Volchik, V.; Posukhova, O. 2016. Precarity and professional identity in the context of institutional change. *Terra Economicus* 14(2):159–173. https://doi.org/10.18522/2073-6606-2016-14-2-159-173

Walliser, B. 2008. Cognitive economics. Springer.

Vyacheslav VOLCHIK
ORCID: http://orcid.org/0000-0002-0027-3442

Liudmila KLIMENKO
ORCID: http://orcid.org/0000-0001-7696-7830

Oxana POSUKHOVA
ORCID: http://orcid.org/0000-0002-5334-9527

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

Publisher
http://jssidoi.org/esc/home

ENTREPRENEURIAL ASSESSMENT OF SUSTAINABLE DEVELOPMENT TECHNOLOGIES FOR POWER ENERGY SECTOR*

Andrey Rogalev[1], Ivan Komarov[2], Vladimir Kindra[3], Olga Zlyvko[4]

[1,2] National Research University "Moscow Power Engineering Institute", Krasnokazarmennaya st., 14, 111250, Moscow, Russian Federation

E-mails:[1]rogalevan@mpei.ru; [2]komarovii@mpei.ru; [3] kindravo@mpei.ru; [4]zlyvkoov@mpei.ru

Received 15 June 2018; accepted 18 September 2018; published 30 September 2018

Abstract. This paper provides a comparative entrepreneurial analysis of modern combined-cycle power generation technologies and future-oriented high-efficiency oxy-fuel combustion cycles with zero emissions. Considering the main criteria for sustainable development, we identify the generation technology that provides the lowest cost of electricity supply and the maximum economic efficiency of investments with equally high environmental indicators. Based on a comprehensive literature review and comparison of the technical and economic parameters of modern and forward-looking generation technologies under different economic conditions, the paper develops and presents the path of increasing the technical level of generation technologies, corresponding to the conditions of sustainable development at each moment of time. Furthermore, the paper analyses the technical and economic characteristics of the combined-cycle technology successfully applied in the world's energy systems and advanced oxy-fuel combustion cycles. In addition, the paper proposes a multifactorial economic-mathematical model that allows to evaluate the performance indicators of any of the considered technologies in accordance with the criteria for sustainable development.

Keywords: sustainable development; power industry; greenhouse gas; power generation; economic efficiency; investment

Reference to this paper should be made as follows: Rogalev, A.; Komarov, I.; Kindra, V.; Zlyvko, O. 2018. Entrepreneurial assessment of sustainable development technologies for power energy sector, *Enterpreneurship and Sustainability Issues* 6(1): 429-445. http://doi.org/10.9770/jesi.2018.6.1(26)

JEL Classifications: O33, Q1; Q4

1. Introduction

A high quality of life nowadays and in the future requires a heavy responsibility of society for the environment, moderate exploitation of natural resources at simultaneous social progress and stable economic development

* *This study was conducted by National Research University "Moscow Power Engineering Institute" and was supported by the Russian Science Foundation under Agreement No. 17-79-20371 dated by July 28th, 2017.*

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

(Meadows et al., 1972). The formation of a life space, where all human needs are satisfied at sufficient level at any time without undercutting the basis for development of society in the future, is a complicated, multi-factorial and multi-criterial problem. In order to solve it, it is advisable to decompile the object of research (the society) into sub-objects, which are liable to the less number of factors, and to select the most important of them from the point of influence on the progress of humanity. This paper selects the power generating industry as a sub-object, as well as its technological basis, which is different types of power generating facilities. The technical and economic characteristics of power generating facilities are the link between the economic conditions of power generating industry operations (i.e., fuel price, labour cost, price per tonne of CO_2) and the resulting parameters that determine the influence of electric power industry condition on the social progress, environment and investment attractiveness (Balitskiy et al., 2014; Zlyvko et al., 2014; Štreimikienė et al., 2016; Strielkowski et al., 2016; Strielkowski et al., 2017a; Strielkowski et al., 2017b; Tvaronavičienė et al., 2017; Strielkowski and Lisin, 2017; Tvaronavičienė 2017; Melas et al., 2017; Tvaronavičienė 2018; Tvaronavičienė et al. 2018).

From the standpoint of sustainable development concept, while planning the development of power industry, one should consider the impact on the state of society. It may be expressed and evaluated as the ratio between the current market price of electric power and the social price level that provides to retain the share of utility fees in the structure of real incomes of households (Kalyugina et al., 2015). The link between the environment and the level of development of electric power industry's technological base can be presented in the units of specific greenhouse gas emissions per kWh of electric power and converted into the cash equivalent by its multiplication by the price of CO2 emission allowance. The investment attractiveness is a factor that characterises the possibility of renovation and modernisation of power generating facilities. It can be evaluated in the classic way, through the economic assessment of investment project's efficiency.

The actual choice of electric power generating technologies, each with its technical and economic characteristics, is a way of reaction on changing economic conditions and is a necessary buffer for keeping the development of society sustainable at every moment of time. The forecasting of changes in economic conditions of power generating industry operations and instruments for evaluation and comparison of quantitative assessments of factors of sustainable development are the necessary components for the construction of trajectory of power generating technology shift. This trajectory should ensure the stability and harmonic development of society at the present time and in the foreseeable future. This paper is dedicated to the second approach. While forecasting both prices for greenhouse gas emissions and the natural gas, and the changes of households' incomes level, the authors referred to the present forecasts.

2. Literature review

The global warming is one of the most serious challenges to sustainable development of humanity over the last 100 years. Since the early 1900s, the average air temperature rose by 0.74 °C; moreover, its major increase occurred during the last 35 years. Starting from 1970, each new decade was warmer than the previous by 0.15 °C (von Deimling, 2006). Figure 1 demonstrates clearly the dynamics of average Earth's surface temperature rising (NASA, 2017). Many scientists agree that the greenhouse effect is the reason of climate change. Lately it is getting worse due to human economic activity. The data announced in the Joint science academies' statement: Global response to climate change (2010) confirm the hypothesis of prevailing impact of anthropogenic factor on the temperature rising. According to it, during the last 250 years, the concentration of carbon dioxide in the atmosphere grew by 95 ppm and now is equal to 375 ppm, which is the maximum value in the last 420 000 years (NAS, 2005). At the moment, the concentration of carbon dioxide in the atmosphere reached 400 ppm (Curran et al., 2016). The fifth report (2013) by the Intergovernmental Panel on Climate Change revealed the forecast scenarios of temperature anomaly rising by 1.1 to 6.4 °C, depending on the volume of greenhouse gas emission (Climate Change, 2013).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

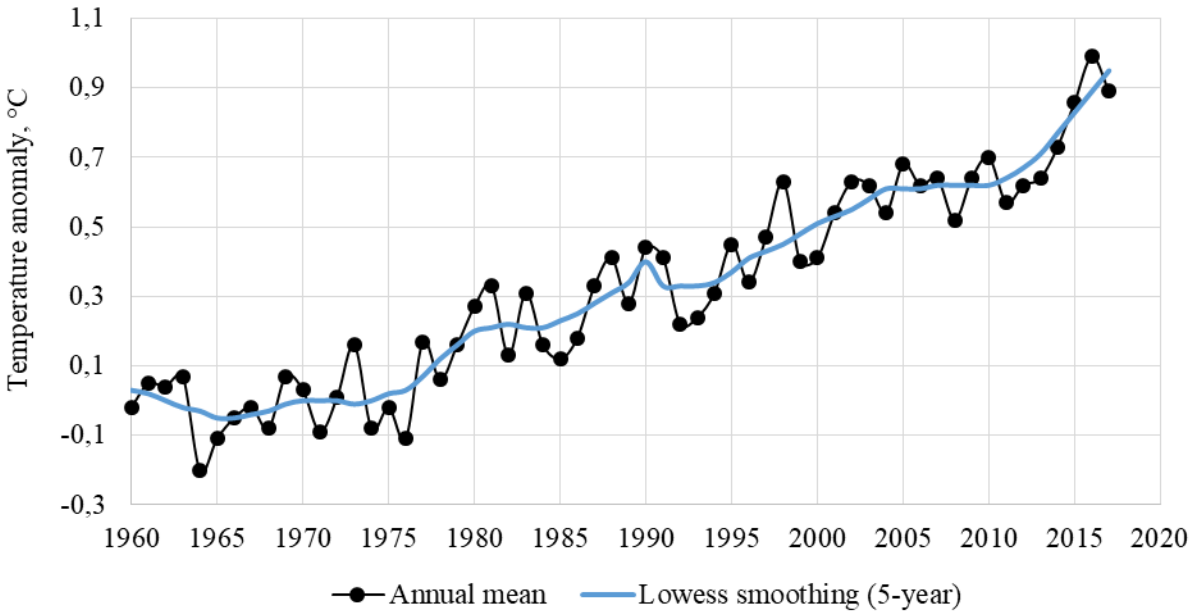


Fig 1. Global temperature index (1960-2017)
Source: NASA (2017)

Although the human role in observable temperature anomalies is still actively debated, the worsening of greenhouse effect is a fact. Despite the human contribution in the rise of CO2 concentration, the reduction of greenhouse gas emissions will favour at least the slowing down the global natural processes, if not the termination of warming. In order to implement the practical efforts on fighting the global warming, the Kyoto Protocol was adopted on 11 December 1997, extending the United Nations Framework Convention on Climate Change.

According to terms and conditions of the Kyoto Protocol, the EU entered into commitments to reduce the carbon dioxide emissions by 20 % by 2013, as compared to the values of 1990, and maintain the reached target values till 2020. The EU's own plans conditioned by its internal objectives provide the adaptation of its legislation in 2030, reflecting the new target value for the reduction of greenhouse gas emissions by 40 %. According to the information by the European Commission, emissions in the EU reduced by 23 % since 1990 till 2016; at that, the GNP grew up by 53 % (EU ETS) (European Commission, 2018a; European Commission, 2018b). Such high results in improvement of ecological performance of economy were obtained due to stimulation and support of development of power generating units based on renewable energy sources and electric power generating technologies with extremely low carbon emissions.

The operations of CO2 emission allowance (quota) trading at the EU Emission Trade System launched in 2005 are source of funds for instruments of support of new environmentally friendly power generation. The participants of this trade system are the enterprises which technological process is related inseparably to greenhouse gas emissions. Each enterprise emitting into atmosphere shall buy the allowance for greenhouse gas emissions either at the European Energy Exchange in Leipzig, Germany, or at the second auction ring which is the Intercontinental Exchange Futures Europe, London, United Kingdom.

Since 2012 till 2016, the prices at the European Union Allowances (EUA) were stabilised at about €5-7 per tonne. However, the latest data indicate almost twice price increase at the EUA within the first four months of 2018 up to

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

€12.5-14 per tonne. According to available forecasts, the price per tonne of carbon dioxide emission can reach €25 by 2030 (Figure 2).

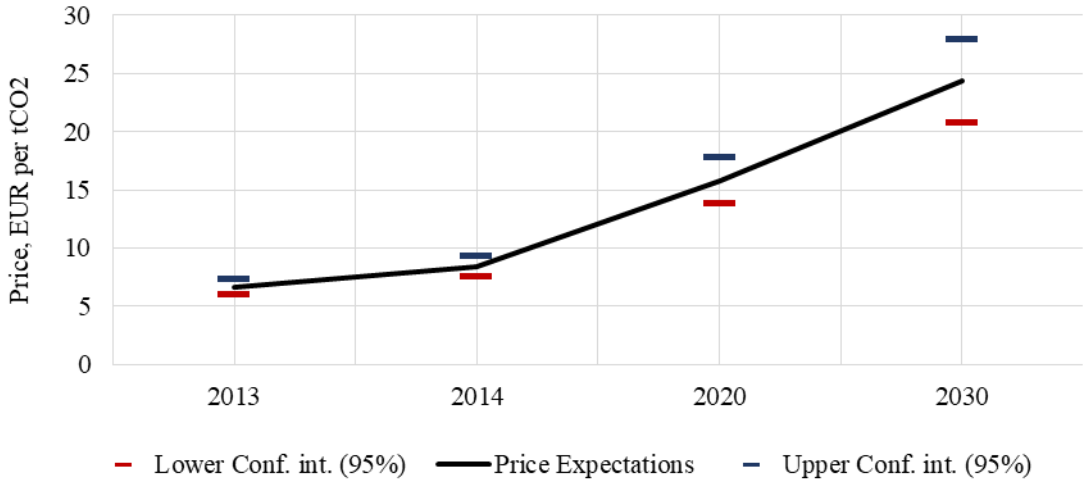


Fig. 2. Forecast of price changes at the EUA
Source: European Commission (2015)

Willing to reduce electricity production costs, power generating companies look for new generation technologies with high energy and environmental efficiency (Lisin et al., 2015a). In an increasingly demand the European power and machine-building enterprises and national research institutions actively work on development of new technologies of electric power generation with zero or extremely low greenhouse gas emissions, particularly, those of CO2. Essential reduction of greenhouse gas emissions into atmosphere for traditional technologies is provided by capturing the carbon dioxide from combustion products using special separating membrane units and its further transportation to storage sites, usually such as voids of rocks or the Earth crust formed in a natural way or as a result of human activities in mining the hydrocarbon fuel. However, the implementation of carbon dioxide capture and storage system (CCS) for steam, gas or combined cycle results to significant increase of auxiliary power consumption and decrease of net efficiency by 10-12 % (Tola et al., 2014). Moreover, the specific capital costs per kW of installed capacity increase almost twice (up to $2000-2200 per kW).

The significant increase of efficiency (up to 55-58 %) at low specific capital costs ($700-1000 per kW) is provided by using the oxy-fuel technology of electric power production (Barba et al., 2016). Compared to traditional power generating technologies, the oxy-fuel combustion producing the water steam and carbon dioxide is its main distinguishing feature as well as its main advantage. Such chemical composition of combustion products allows for separation of carbon dioxide and steam by condensation of the latter. It requires the minimum auxiliary power resources and provides the further capture and storage processes. The works on structural and parametric optimisation of cycle arrangements based on various thermodynamic cycles are performed within the framework of this research area. The following cycles of advanced power plants are the best known today: semi-closed oxy-fuel combustion combined cycle (SCOC-CC), NET Power cycle (also called Allam cycle), Graz cycle. The almost total absence of hazardous gas emission is the common characteristic of the above-mentioned cycles. The oxy-fuel technology allows to capture up to 99 % of CO2 that forms as a result of combustion of carbon-containing fuel in the oxygen. According to existing assessments, the rest of technical and economic parameters of advanced cycles of thermal power plants essentially differ. Cycles are characterised with different levels of efficiency and specific capital costs. The information about the main technical and economic indices for the most

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

advanced configurations of oxy-fuel cycles is presented in Table 1 (Yang et al., 2012; Allam et al., 2013; Sanz et al., 2005; Advanced, 2002).

Table 1. Technical and economic indices of advanced oxy-fuel power systems

Cycle	Fuel	Air separation unit type	Initial tempera-ture, °C	Initial pressure, bar	Efficiency, %	Specific investment costs, $/kW	NET power, MW
SCOC-CC	CH_4	Cryog.	1,300-1600	60-90	45-50	714 (in 2005)	400
NET Power cycle	CH_4	Cryog.	1150	200-400	55-59	800-1000 (in 2013)	250
C Graz cycle	CH_4	Cryog.	1400	180	49-54	634.5 (in 2005)	82.75
Combined cycle gas turbine with CCS	CH_4	Cryog.	1400-1600	20-30	44-48	> 1000	90-450
Combined cycle gas turbine without CCS	CH_4	–	1600	20-30	55-60	2100	340

Source: Own results

The SCOC-CC has the least power efficiency as its configuration is the simplest among other oxy-fuel cycles. In fact, this is the Brayton-Rankine combined cycle using oxygen as a fuel oxidiser and the dioxide recirculation. For the temperature of working fluid at the turbine inlet equal to 1300 °C, the net efficiency of electric supply for this cycle does not exceed 45 % (Yang et al., 2012).

The net efficiency of electric supply for NET Power cycle working on the natural gas lays within the range of 55 to 59 %. The highest efficiency is reached due to optimisation of parameters of closed cycle of supercritical carbon dioxide. The compression of working fluid in the compressor occurs very close to the phase boundary of carbon dioxide. The carbon dioxide is almost incompressible in this area, and costs for its compression are the minimum. The use of intermediate coolers of compressor also allows to decrease the work for compression. The final increase of working fluid pressure before it is fed into the high-temperature regenerator is occurred in the pump. The high value of the minimum pressure in the cycle (20-30 bar) provides relatively low costs of carbon dioxide storage (Allam et al., 2013).

The idea of development of the Graz cycle belongs to Herbert Jericha who presented his concept to the world research community in 1985. Since then, the cycle was modified many times: the composition of working fluid varied, the low-potential part was separated into an individual circuit, and the recirculating compressor was used in order to withdraw the working fluid right after the heat recovery steam generator. The most effective modification was named the C Graz cycle (Sanz et al., 2005). Among other oxy-fuel cycles, its distinguishing feature is the high content of water steam in the working fluid (up to 79 %). The intermediate coolers of compressor and relatively low consumption for turbine cooling provide the higher efficiency compared to the SCOC-CC.

Despite the type of used fuel, the greatest net efficiency value on electric supply was observed for the NET Power cycle. For combined cycle units working on the natural gas and coal this parameter is less by 11-12 %. Due to relatively high pressure in the circuit and low number of elements, the unit based on the Allam cycle is rather compact which influences its competitive level of specific capital cost index.

Considering the variety of both existing and advanced power generating technologies providing high environmental performance indices, their comparison at different economic conditions (fuel prices, electricity prices, carbon dioxide prices as the key external economic parameters providing the investment attractiveness of power generating facility) is a matter of interest for the purpose of development of trajectory of power generating technology shift (Lisin et al., 2015a; Lisin et al., 2016). The transition to the new type of power plants will have

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

the system impact on the national economy. This effect can be manifested as the change of equilibrium price at the electric power market, the change of the greenhouse gas emission amount, and the change of hydrocarbon fuel consumption. Due to this impact, we shall use the aggregate of criteria considering the influence of parameters of electric power industry on the social and environmental aspects of development of society and on the investment attractiveness of construction of new thermal power plants (Konova et al., 2012; Lisin et al., 2015a; Koelbl et al, 2015).

3. Model description and the data

In order to compare different power generating technologies for compliance of criteria of sustainable development at the present and forecast economic conditions, a multi-factorial and multi-criterial economic and mathematical model was developed. The model calculations presume to go through three stages, which essence and sequence are clearly demonstrated at Figure 3.

The first stage of assessment presumes the calculation of ecological efficiency parameters for different power generation technologies. This index depends on three values: fuel type (it determines the composition of combustion products), efficiency of electric production and efficiency of carbon dioxide capture and storage system (if any). Table 2 presents the values of specific emissions of carbon dioxide per kWh of generated electric energy for modern and advanced electric power generating technologies using the natural gas as a fuel.

According to the data presented in Table 2, the power generating facilities based on the NET power cycle is the most environmentally friendly technology providing the minimum greenhouse gas emissions. Compared to the ordinary combined cycle unit without collection and disposal of CO2, advanced oxy-fuel power generating units based on the NET power cycle provide the decrease of emissions by 99 %. However, oxy-fuel cycles with relatively high emissions (semi-closed oxy-fuel combustion combined cycle) also demonstrate the extremely high efficiency as they decrease emissions by 98.9 %. Combined cycle units with CCS demonstrate less significant decrease of CO2 emissions, 87.5 %, which is about 11.4 % worse than the same parameter of oxy-fuel cycles.
Screening power generating technologies out with respect to environmental criterion should base on comparison of their indices of decrease of emissions relatively to today's most common types of thermal power plants and regional target values for the decrease of greenhouse gas emissions. The EU plans regarding the decrease of carbon dioxide emissions till 2050 are demonstrated at Figure 4 (EU ETS, 2017).

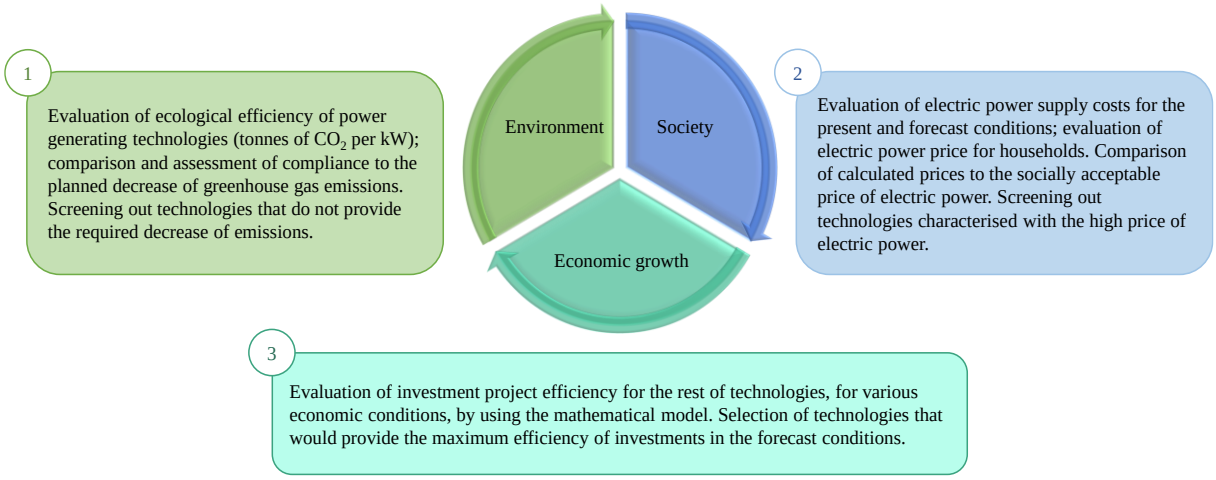


Fig. 3. The stages of calculations for the assessment of parameters of sustainable development while choosing power generating technologies

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

Source: EU ETS (2017)

Table 2. Specific emissions of CO2 of different power generating technologies using the natural gas as a fuel

Cycle	Net efficiency		CO2 capture rate, %	Specific amount of CO2 removed from the cycle, kg/kWh		Specific amount of CO2 captured from the cycle, kg/kWh		Specific amount of CO2 emitted from the cycle to the atmosphere, kg/kWh	
	min	max	max (ideal)	min	max	min	max	min	max
SCOC-CC	45	50	99	0.4304	0.3873	0.4261	0.3835	0.00387	0.00430
NET power cycle	55	59	99	0.3521	0.3282	0.3486	0.3250	0.00328	0.00352
C Graz cycle	49	54	99	0.3952	0.3586	0.3913	0.3550	0.00358	0.00395
Combined cycle gas turbine with CCS	44	48	90	0.4401	0.4035	0.3961	0.3631	0.04034	0.04401
Combined cycle gas turbine without CCS	55	60	0	0.3521	0.3228	0.0000	0.0000	0.3228	0.3521

Source: Own results

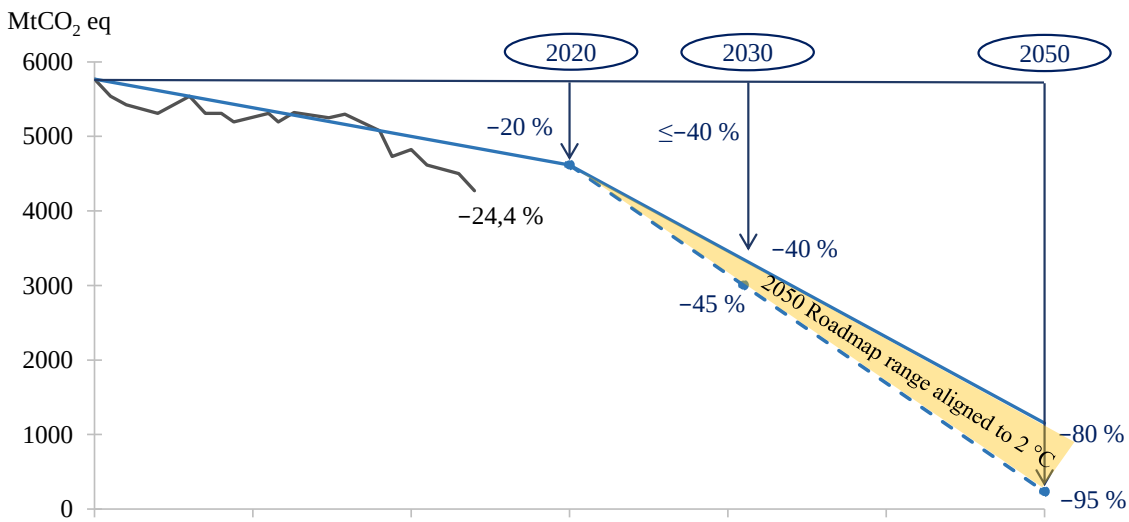


Fig. 4. Planned reduction of CO2 emissions in the EU to 2050
Source: EU ETS (2017)

According to Figure 4, the emissions of carbon dioxide shall be decreased by 80-95 % by 2050, compared to the level of 1990. So significant decrease of emissions is possible to achieve by improvement of ecological efficiency of equipment in all industries producing emissions (aviation, motor vehicles, steel works, cement plants, etc.). About 25 % of these emissions are produced by power industry. Considering that development and experimental operation of a new technology may take 10 to 15 years while the complete replacement of obsolete generating facilities with new will require decades, one shall develop and then construct thermal power plants, which ecological efficiency indices would significantly exceed today's average level.

Therefore, the criterion of sustainable development that takes into account the influence of electric power industry on the environment can be expressed as follows:

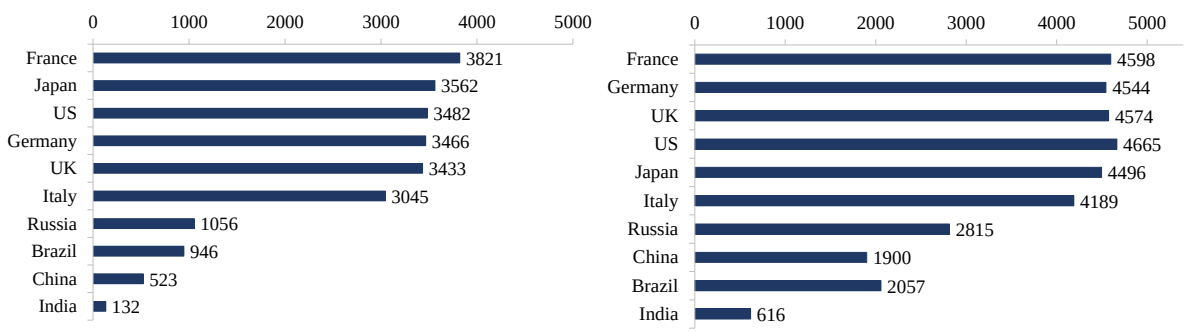
$$K_1: \Delta Eff_{\text{ecology}} \geq \frac{\Delta V_{\text{CO2}\,i}}{m_i};\ \Delta Eff_{\text{ecology}} = \left(1 - \frac{Eff_{\text{ecology}}^{\text{new}}}{Eff_{\text{ecology}}^{\text{current}}}\right) \cdot 100\%, \quad (1)$$

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

where $\Delta Eff_{\text{ecology}}$ represents the growth of ecological efficiency of power generating technology; $Eff_{\text{ecology}}^{\text{new}}$ and $Eff_{\text{ecology}}^{\text{current}}$ represent the indices of ecological efficiency of new and existing power generating technologies, kgCO2/kWh; $\Delta V_{\text{CO2}\,i}$ represents required decrease of greenhouse gas emissions to the atmosphere by *i*-th year (the forecast value), %; m_i represents a coefficient that considers the disbalance between the required rate of improvement of ecological efficiency indices and the real rate of developments; it varies from 0.01 to 1 (the less is the value, the worse is the disbalance).

The second stage is aimed to select technologies that provide the socially acceptable electric power price level for households. According to suggested approach and the concept of sustainable development, the improvement of technology performance in order to respond the challenges should not result to essential decrease of household incomes caused by increased obligatory utility costs in the structure of budget.

Considering the social factor at the limit, we revealed that the invariable value of income share paid by each inhabitant for electric power corresponds to ideal trajectory of power generating technology shift. In order to select technologies to be reviewed at the last stage of assessment, we had to plot the curve of changing the socially acceptable price within the considered period of time. This curve is based on the forecast of change of average household income per capita in different countries (Figure 5) (Global wage, 2013) and on the forecast of change of average electric power price for households (Figure 6) (European Commission, 2016).



a) in 2011 b) in 2030

Fig. 5. Average wage per month (US$)
Source: European Commission (2016)

We considered Germany as an example. Among other European countries, the electric power consumption index per capita for households of Germany is average and equals to 1,731 kWh per annum. According to the data of 2017, the average net salary after tax in Germany equals to € 2302 per month. Considering the data presented at Figure 6, the income share paid for electric power in Germany is 1 % in average. According to Figure 6, the wages in Germany should increase by 41.7 % by 2030. Therefore, in order to match the criterion that considers the influence of electric power industry on the social environment, by 2050, the maximum price of electric power for households should not exceed €185 per MWh.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

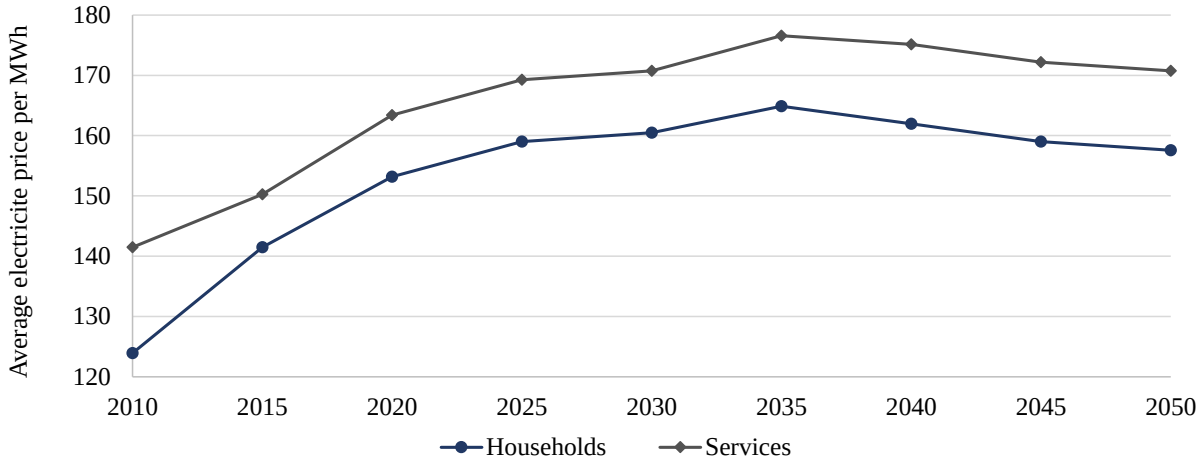


Fig. 6. Forecast of change of average electric power price for various branches of economy in perspective by 2050
Source: European Commission (2016)

In order to select power generating technologies complying to the above-described criterion, it is advisable to proceed from calculated values of cost of electric power supply. At that, the shift to the price of electric power for the purpose of direct comparison of obtained value to the maximum permissible one can be carried out by using the forecast decomposition of electric power cost (Figure 7) (EU ETS, 2017).

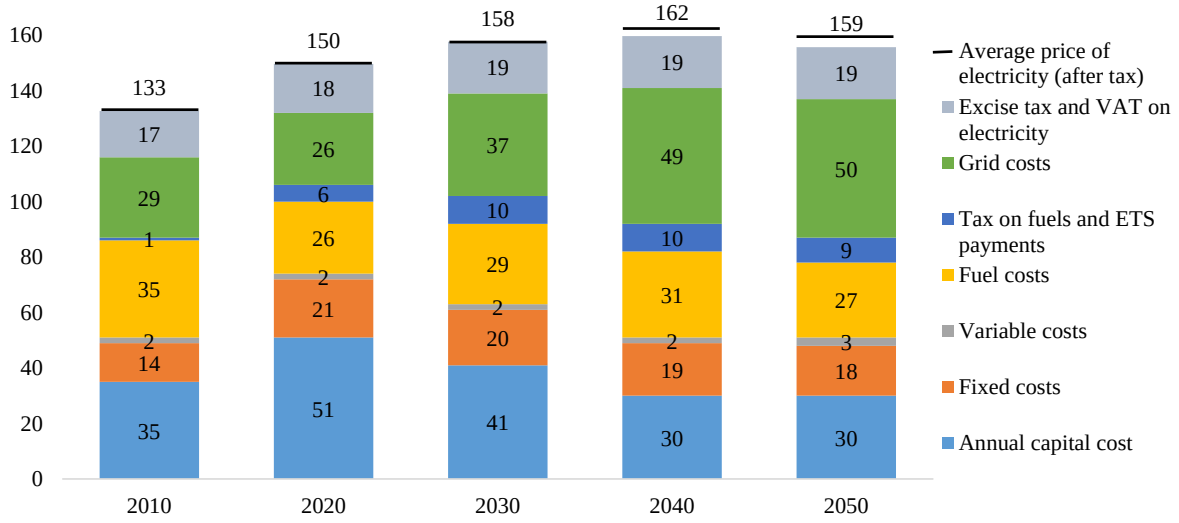


Fig. 7. Forecast decomposition of electric power cost in perspective by 2050
Source: EU ETS (2017)

According to the forecast data presented at Figure 8, the electric power production cost (including taxes) in the structure of electric power price is changing from 86 to 54.7 % from 2010 by 2050.
Proceeding from the above-said, we could formulate the condition of fulfilment of social criterion of sustainable development for the electric power industry as follows:

$$K_2: EPC_{ij} \cdot s_j = EC_{ij} \leq EC_{\lim j}, \quad (2)$$

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

where EPC_{ij} represents the cost of supply of electric power produced by using the *i*-th technology, in *j*-th year's conditions, € per kWh; EC_{ij} represents the price of electric power produced by using the *i*-th technology, in *j*-th year's conditions, € per kWh; s_j represents the share of cost of electric power supply in the structure of its price (for *j*-th year); $EC_{\lim j}$ represents the limit price of electric power at which the share of income paid for utility fees does not increase.

The third stage of assessment includes the calculation of efficiency indices of investment projects of construction of new power generating facilities for the present and forecast economic conditions and subsequent ranking of power generating technologies in descending order of NPV and DPP values. The construction of trajectory of shift to new power generating technologies shall be performed on the basis of selection of various options that would provide the maximum economical efficiency at each moment of time (Lisin et al., 2015b).

The economic and mathematical model is based on the standard equation for calculation of electric power supply cost:

$$EPC_{ij} = C_{\text{fuel}} + C_{\text{ETS}} + C_{\text{FC}} + C_{\text{wage}} + C_{\text{tax}}, \tag{3}$$

where C_{fuel} represents specific costs of fuel for thermal power stations, € per kWh; C_{ETS} represents specific costs for the purchase of allowances for CO2 emissions, € per kWh; C_{FC} represents specific fixed costs (amortisation and repair stock fees), € per kWh; C_{wage} represents specific labour and social insurance costs, € per kWh; C_{tax} represents fuel fees, € per kWh.

The share of fuel costs in the structure of electric power supply costs is about 40-60 %. This value depends on the fuel price and efficiency of electric power production:

$$C_{\text{fuel}} = P_{\text{fuel}} \cdot \frac{0.000611}{\eta_{\text{EP}}}, \tag{4}$$

where P_{fuel} represents the fuel price, € per boe; η_{EP} represents the efficiency of electric power production.
Specific costs for the purchase of allowances for carbon dioxide emissions depend on the allowance price, type of fuel and efficiency. This value for the natural gas is defined as follows:

$$C_{\text{ETS}} = P_{\text{ETS}} \cdot 0.1934 \cdot \left(1 - K_{\text{cap}}\right) \cdot \frac{1}{\eta_{\text{EP}}}, \tag{5}$$

where P_{ETS} represents the price of allowance for CO2 emission, € per kWh; K_{cap} represents a coefficient reflecting the rate of captured CO2 (0 if no CCS system is used).

Labour and social insurance costs is defined as follows:

$$C_{\text{wage}} = n \cdot W_{\text{av}} \cdot (1 + \alpha_{\text{social}}), \tag{6}$$

where n represents the number of staff of thermal power station (150 employees for 400 MW power unit); W_{av} represents the average salary in the industry, € per month; α_{social} represents social insurance fees.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

Fixed costs include repair costs and amortisation. These values are directly proportional to the value of capital costs. Repair costs are defined as follows:

$$C_{\mathrm{FC}} = I_{\mathrm{specific}} \cdot \left(\beta \cdot \frac{1}{K_{\mathrm{PU}} \cdot \tau_{\mathrm{year}}} + \frac{N_{pp}}{\tau_{\mathrm{expl}}} \right), \quad (7)$$

where I_{specific} represents specific capital costs, € per kW; K_{PU} represents a plant-use factor; β represents the share of repair costs; N_{pp} represents installed capacity of unit, kW; τ_{expl} represents a useful life period of thermal power station, years.
Efficiency indices of investment project (NPV and DPP) were evaluated in a classic way on the basis of UNIDO technique provisions.

4. Results of calculation and analysis

Each of reviewed power generating technologies matches the target values of existing plans of greenhouse gas emission decrease. According to the data provided above, the oxy-fuel technology allows to decrease the CO2 emissions by approximately 98.8 % compared to today's widely accepted power generating units based on combined cycle. Modification of combined cycle units by installing the CCS system helps decrease the carbon-containing emissions by 87 %. Considering the long terms of development and diffusion of new technologies in the electric power industry (the research, the experimental operation, and the massive renovation of thermal power plants may take 40 years) and significant decrease of carbon dioxide emissions by 2030 (by 20 %, see Figure 4), we could assume the value of m_i coefficient (equation (1)) equal to 0.25. Therefore, investment projects of construction of thermal power plants, which could provide the decrease of emission by at least 80 % compared to the present level, should be implemented in the coming decades.

In order to check the reviewed technologies for their compliance to the social criterion of sustainable development, a variants calculations of electric power cost and price for households at the present and forecast economic conditions was carried out. Table 3 presents the basic data for the calculation.

Table 3. The basic data for estimate calculation of cost

	2017	2030	2040	2050
Fuel price, € per boe	50	60	70	75
Price of CO2 emissions, € per kg of CO2	12.8	30	47	90
Labour price, € per employee per annum	50000	50680	51187	51694

Source: Own results

The assumed techno-economic parameters (efficiency, specific CO2 emissions, and specific capital costs) were presented in Table 1 and Table 2. While calculating the fuel costs, two efficiency values, the minimum and the maximum, were assumed. The minimum efficiency corresponds to the initial level of technology, or its condition before the improvement and modernisation. The maximum efficiency demonstrates the optimistic expectation level, these values are achievable in the future. The maximum value of specific capital costs was assumed. Considering the forecast nature of data and the absence of practically implemented projects of construction of power plants based on oxy-fuel technology, we found it reasonable to assume the overestimated value in order to avoid the possible risks of increase in the cost of thermal power plants.

Figure 8 demonstrates the results of optional calculations of electric power selling price for households, assuming that the electric power was produced using the studied technologies. The transition from the cost of electric power supply, which was determined by estimation of cost items (equation (3)) and their multiplication to the price of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

electric power delivered to customers (including the profit of power generating companies), was performed on the basis of forecast rate of electric power supply cost in the structure of overall cost of electric power preparation for consumption. The data were presented at Figure 7.

The curve corresponding to the forecast level of electric power selling price is marked green at Figure 8. Starting from 2030, the price value begins to decrease essentially. As a result, by 2040, only power generating facilities based on NET power cycle will remain profitable when selling the electric power. According to the forecast data, none of reviewed technologies will bring profit by 2050. This result was explained by mutually changing prices of fuel, CO2 emissions, and electric power. The first two parameters, which mostly determine the cost of electric power, will rise by 2050 relatively to the level of 2017: the natural gas price will grow by 50 % and the price of emissions – by 603 %. The reason of essential increase of allowance charges for CO2 emissions are the plans of significant decrease (up to 90 %) of greenhouse gas emissions by 2050. However, it is worth mentioning that, due to the high rate of CO2 capture from combustion products (99 %), the exponential rise of the EUA prices does not impact essentially on the growth in cost, which is generally determined by the increase of natural gas price. On the other hand, the selling price of electric power will decrease by 22.3 %, despite the rise adequate to the growth in cost by 2050 compared to the level by 2030. The disbalance between the price and cost of electric power will result to losses in power generating companies. Table 4 presents the results of calculation of specific revenue gained by selling the electric power at the present and forecast economic conditions.

According to the data presented in Table 4, the present power generating technologies (combined cycle units and those equipped with the CCS) will not bring profit in 2040. Power plants based on the semi-closed oxy-fuel combined cycle and C Graz cycle will be profitable only if these cycles will be highly effective. None of considered technologies will have a positive economic effect by 2050. At that, because of its high efficiency, Allam cycle demonstrates the best performance indices.

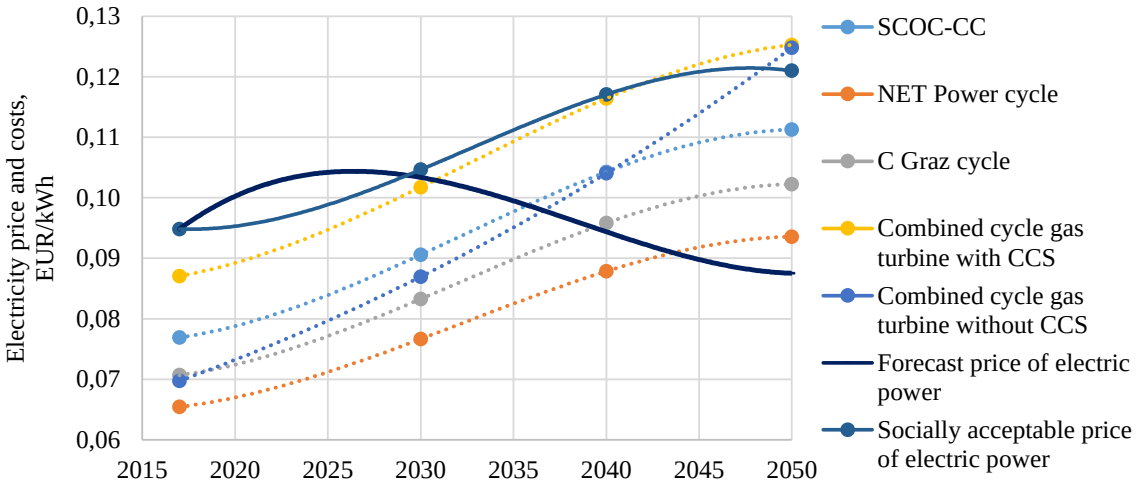


Fig. 8. Change of forecast cost of electric power produced by existing and advanced power generating technologies
Source: Own results

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

Table 4. Specific profit of power generating companies (€ per kWh) at the present and forecast economic conditions (revenue at the minimum efficiency / revenue at the maximum efficiency)

Cycle	2017	2030	2040	2050
SCOC-CC	0.018/0.025	0.013/0.021	-0.010/0.000	-0.024/-0.014
NET power cycle	0.029/0.033	0.027/0.031	0.007/0.012	-0.006/0.000
C Graz cycle	0.024/0.030	0.020/0.027	-0.001/0.007	-0.015/-0.006
Combined cycle gas turbine with CCS	0.008/0.014	0.002/0.009	-0.022/-0.014	-0.038/-0.029
Combined cycle gas turbine without CCS	0.025/0.030	0.016/0.023	-0.010/-0.002	-0.037/-0.028

Source: Own results

The obtained results do not allow to consider the economic criterion of sustainable development fulfilled starting from 2040 due to the obvious lack of investment attractiveness of electric power generation at assumed forecast conditions. In order to improve it, it is necessary to increase the specific profit of power generating companies by lifting the electric power prices, providing that they do not exceed the socially acceptable values. According to the above-presented estimates, the limit level of electric power price for the customers should not exceed €0.185 per kWh in 2050. Using the linear approximation, we could evaluate the limit price for 2040, which is €0.179 per kWh. Considering that, according to Figure 7, the rate of selling price in the structure of electric power price for households will equal to 57.9 % and 54.7 % in 2040 and 2050 correspondingly, the selling price will equal to the following values: 0.117 (2040) and 0.121 (2050). It is not advisable to set the increased level of price before 2040 as the specific revenue is positive for this period of time. The analysis of profitability of power generating companies was carried out for the new values. Its results are presented in Table 5.

Table 5. Specific revenue of power generating companies (€ per kWh) for the new price values (revenue at the minimum efficiency / revenue at the maximum efficiency)

Cycle	2017	2030	2040	2050
SCOC-CC	0.018/0.025	0.013/0.021	0.013/0.022	0.010/0.020
NET power cycle	0.029/0.033	0.027/0.031	0.029/0.035	0.027/0.033
C Graz cycle	0.024/0.030	0.020/0.027	0.021/0.029	0.019/0.027
Combined cycle gas turbine with CCS	0.008/0.014	0.002/0.009	0.001/0.009	-0.004/0.005
Combined cycle gas turbine without CCS	0.025/0.030	0.016/0.023	0.013/0.021	-0.004/0.006

Source: Own results

The results of calculation for the new prices revealed that any oxy-fuel power generating technology will be profitable by 2050. With that, despite a minor decrease of economic efficiency in time, anyway it will remain sustainably positive on the whole. The existing thermal power plants based on traditional technologies will bring profit only at high values of electric power generation efficiency.

Therefore, the price increase introduced into the model provided the long-term profitability at the 2017 level for the most of companies; at that, it did not result to an extra load for the households in the form of increased share of income spent for the electric power, providing the fulfilment of the social criterion of sustainable development. In order to select the best power generating technology or a group of those after they are checked for matching the ecological and social criteria of sustainable development, it is necessary to perform the final check of investment attractiveness of construction of new power plants and select technologies, the use of which will give the maximum economic efficiency.

This assessment was carried out in accordance with the UNIDO technique. The NPV and DPP indices were the sought values. The maximum efficiency values were assumed for calculations. The estimation of NPV and DPP for a particular year presumed the imaginary start of investment project for construction of a thermal power plant

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

at the specified moment of time. At that, the external economic parameters were accepted in accordance with the forecast values for this period. While assessing the investment project of 2050, the external economic parameters were evaluated according to the trend formed within the last 10 years. The duration of investment project was accepted equal to 20 years.

The final results of calculation are presented in Table 6.
The C Graz cycle provides the maximum economic efficiency. Despite the less efficiency of cycle (by 4 %) compared with NET power cycle, the lower capital costs (by 57.7 %) provide the fast payback and profitability of investments.

Table 6. Calculated values of NPV and DPP for investment projects of construction of new thermal power plants

Cycle	2017		2030		2040		2050	
	NPV	DPP	NPV	DPP	NPV	DPP	NPV	DPP
SCOC-CC	98.49	10	54.24	13.7	16.01	17.6	-40.51	–
NET power cycle	74.74	12.8	6.94	19.6	-31.29	–	-87.65	–
C Graz cycle	144.86	8.8	89.18	11	50.95	13	-5.41	–
Combined cycle gas turbine with CCS	-336.26	–	-372.82	–	-411.05	–	-467.41	–
Combined cycle gas turbine without CCS	74.19	12.7	15.41	18.2	-22.81	–	-79.18	–

Source: Own results

5. Conclusions and discussions

The analysis of data presented in table 6 allows for conclusion regarding the decrease of NPV and increase of DPP for all reviewed power generating technologies in both medium- and long-term perspective. It is caused by decreasing profit of power generating companies due to the forecast disbalance between the electric power price and that of fuel. The increase of the first one to the socially accepted level improved the situation but did not eliminate the disbalance completely. This disbalance resulted to the loss of investment attractiveness of all power generating facilities by 2050 and failure to fulfil the criteria of sustainable development.

Actually, the reason of such results may be the incorrect forecasting of electric power price and its structure as it did not fully consider the dynamics of growth in prices of emissions and fuel. However, such disbalances occur in practice regularly. The market responds to their appearance by increased electric power prices, which may result to essential excess of socially acceptable level and failure to fulfil the social criterion of sustainable development. In order to avoid such situations, the following is required:

- Provision of development of national economy and the increase in labour productivity, and hence, the growth in household incomes, which would be the buffer in case of electric power price rise,
- Development of oxy-fuel power generating technologies and improvement of their efficiency,
- Development of engineering solutions and improvement of technology of manufacturing of power generating equipment, which would provide the decrease in specific capital costs.

In order to solve the scientific problem of selection of power generating technologies providing the sustainable development in different economic conditions, one should design and develop the forecasting tools for electric power market, fuel and energy resource market, and labour market. Also, one should create and develop multi-factorial models for evaluation of power equipment costs. These models should provide the possibility of obtaining more accurate estimates of specific capital costs. Some significant results were already obtained in this area. They should be expanded for the oxy-fuel cycle equipment.

The approaches and the model of assessment of oxy-fuel and combined cycle electric power generating technologies from the point of sustainable development provided in this paper soon may be essential in Russia in order to solve the problems of selection of technological base while planning the development of electric power industry in the foreseeable perspective.

Acknowledgements

This study was conducted by National Research University "Moscow Power Engineering Institute" and was supported by the Russian Science Foundation under Agreement No. 17-79-20371 dated by July 28th, 2017.

References

Allam, R. J.; Palmer, M. R.; Brown, G. W.; Fetvedt, J.; Freed, D.; Nomoto, H.; Jones, C. 2013. High efficiency and low cost of electricity generation from fossil fuels while eliminating atmospheric emissions, including carbon dioxide. *Energy Procedia* 37: 1135-1149. https://doi.org/10.1016/j.egypro.2013.05.211

Balitskiy, S.; Bilan, Y.; Strielkowski, W. 2014. Energy security and economic growth in the European Union. *Journal of Security and Sustainability Issues 4*(2):125-132

Barba, F. C.; Sanchez, M.-D. G.; Segui, S. B.; Darabkhani, G. H.; Anthony, E. J. 2016. A technical evaluation, performance analysis and risk assessment of multiple novel oxy-turbine power cycles with complete CO 2 capture. *Journal of Cleaner Production* 133: 971-985. https://doi.org/10.1016/j.jclepro.2016.05.189

Climate Change 2013: The Physical Science Basis. Cambridge: Cambridge University Press, 2013, p. 1535.

Curran, J. C.; Curran, S. A. 2016. Indications of positive feedback in climate change due to a reduction in Northern Hemisphere biomass uptake of atmospheric carbon dioxide. *Weather* 71(4): 88-91. https://doi.org/10.1002/wea.2715

EU ETS. 2017. State of the EU ETS Report.

European Commission, 2016. EU Reference Scenario. 2016. Energy, transport and GHG emissions: Trends to 2050. Brussels, p. 221.

European Commission. 2015. Study on the impacts on low carbon actions and investments of the installations falling under the EU Emissions Trading System (EU ETS). Brussels: European Commission, p. 184.

European Commission. 2018a. EU Emissions Trading System (EU ETS). Available from the Internet: https://ec.europa.eu/clima/policies/ets_en

European Commission. 2018b. Strategic Energy Technologies Information System: NER 300: https://setis.ec.europa.eu/NER300

Kalyugina, S.; Strielkowski, W.; Ushvitsky, L.; Astachova, E. 2015. Sustainable and secure development: facet of personal financial issues. *Journal of Security and Sustainability Issues 5*(2):297-304. https://doi.org/10.9770/jssi.2015.5.2(14)

Koelbl, B. S.; Wood, R.; van den Broek, M. A.; Sanders, M. W. J. L.; Faaij, A. P. C.; van Vuuren, D. P. 2015. Socio-economic impacts of future electricity generation scenarios in Europe: Potential costs and benefits of using CO2 Capture and Storage (CCS). *International Journal of Greenhouse Gas Control* 42: 471-484. https://doi.org/10.1016/j.ijggc.2015.08.010

Konova, O.; Komarov, I.; Lisin, E. 2012. The relevance of power generating capacities based on the combined cycle power plants of high power. *Czech Journal of Social Sciences, Business and Economics*, 1(1): 101-109. https://doi.org/10.24984/cjssbe.2012.1.1.11

Lisin, E.; Rogalev, A.; Strielkowski, W.; Komarov, I. 2015a. Sustainable modernization of the Russian power utilities industry. *Sustainability* 7(9): 11378-11400. https://doi.org/10.3390/su70911378

Lisin, E.; Sobolev, A.; Strielkowski, W.; Garanin, I. 2016. Thermal efficiency of cogeneration units with multi-stage reheating for Russian municipal heating systems. *Energies 9*(4): 269. https://doi.org/10.3390/en9040269

Lisin, E.; Strielkowski, W.; Komarov, I.; Garanin, I. 2015c. Improving the methodology of main power equipment choice for the gas turbine plants. *Electronics* 19(2): 80-87. https://doi.org/10.7251/ELS1519080L

Meadows, D. H.; Meadows, D. L.; Randers, J.; Behrens, W.W III. The Limits to Growth. New York: Universe Books, 1972, p. 205.

Melas, V.; Lisin, E.; Tvaronavičienė, M.; Peresadko, G.; Radwański, R. 2017. Energy security and economic development: renewables and the integration of energy systems. *Journal of Security and Sustainability Issues* 7(1): 133-139. https://doi.org/10.9770/jssi.2017.7.1(11)

NAS. 2005. National Academies of Sciences, Engineering, and Medicine et al. Joint Science Academies' Statement: Global Response to Climate Change.

NASA. 2017 Global Annual Mean Surface Air Temperature Change. https://data.giss.nasa.gov/gistemp/graphs/#

PWC. 2013. Global wage projections to 2030. London: PWC, p. 14.

Sanz, W.; Jericha, H.; Luckel, F.; Heitmeir, F. 2005. A further step towards a Graz cycle power plant for CO2 capture, *Proc. ASME Turbo Expo 2005: Power for Land, Sea, and Air*. Reno, NV, USA: ASME, 2005. https://doi.org/10.1115/GT2005-68456

Štreimikienė, D.; Strielkowski, W.; Bilan, Y.; Mikalauskas, I. 2016. Energy dependency and sustainable regional development in the Baltic states: A review. *Geographica Pannonica*, *20*(2):79-87. https://doi.org/10.5937/GeoPan1602079S

Strielkowski, W.; Lisin, E. 2017. Economic Aspects of Innovations in Energy Storage. *International Journal of Energy Economics and Policy 7*(1): 62-66.

Strielkowski, W.; Lisin, E.; Astachova, E. 2017a. Economic sustainability of energy systems and prices in the EU. *Entrepreneurship and Sustainability Issues* 4(4): 591-600. https://doi.org/10.9770/jesi.2017.4.4(14)

Strielkowski, W.; Lisin, E.; Tvaronavičienė, M. 2016. Towards energy security: sustainable development of electrical energy storage. *Journal of Security and Sustainability Issue*s 6(2): 43–52. http://dx.doi.org/10.9770/jssi.2016.6.2(4)

Strielkowski, W.; Štreimikienė, D.; Bilan, Y. 2017b. Network charging and residential tariffs: A case of household photovoltaics in the United Kingdom. *Renewable and Sustainable Energy Reviews 77:*461-473. https://doi.org/10.1016/j.rser.2017.04.029

Tola, V.; Pettinau, A. 2014. Power generation plants with carbon capture and storage: a techno-economic comparison between coal combustion and gasification technologies. *Applied Energy* 113: 1461-1474. https://doi.org/10.1016/j.apenergy.2013.09.007

Tvaronavičienė, M. 2017. Clusters, innovations and energy efficiency: if relantionship could be traced, *Marketing and Management of Innovations* 2: 382 - 391 http://doi.org/10.21272/mmi.2017.2-35

Tvaronavičienė, M. 2018. Towards sustainable and secure development: energy efficiency peculiarities in transport sector. *Journal of Security and Sustainability Issues* 7(4): 719-725. https://doi.org/10.9770/jssi.2018.7.4(9)

Tvaronavičienė, M., Tarkhanova, E., & Durglishvili, N. 2018. Sustainable economic growth and innovative development of educational systems. *Journal of International Studies* 11(1): 236-244. https://doi.org/10.14254/2071-8330.2018/11-1/19

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(26)

Tvaronavičienė, M.; Nesterova, K.; Kováčik, V. 2017. Energy security and long-term energy efficiency: case of selected counties. *Journal of Security and Sustainability Issues* 7(2): 349-357. https://doi.org/10.9770/jssi.2017.7.2(14)

von Deimling, T. S.; Held, H.; Ganopolski, A.; Rahmstorf, S. 2006. Climate sensitivity estimated from ensemble simulations of glacial climate. *Climate Dynamics* 27(2-3): 149-163. https://doi.org/10.1007/s00382-006-0126-8

Yang, H. J.; Kang, D. W.; Ahn, J. H.; Kim, T. S. 2012. Evaluation of design performance of the semi-closed oxy-fuel combustion combined cycle. *Journal of Engineering for Gas Turbines and Power* 134 (11): 227-238. https://doi.org/10.1115/GT2012-69141

Zlyvko, O.; Lisin, E.; Rogalev, N.; Kurdiukova, G. 2014. Analysis of the concept of industrial technology platform development in Russia and in the EU. *International Economics Letters* 3(4): 124-138. https://doi.org/10.24984/iel.2014.3.4.2

Andrey ROGALEV
ORCID: http://orcid.org/0000-0001-7256-0144

Ivan KOMAROV
ORCID: http://orcid.org/0000-0003-3853-8220

Vladimir KINDRA
ORCID: http://orcid.org/0000-0002-8406-7901

Olga ZLYVKO
ORCID: http://orcid.org/0000-0003-0554-4026

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

Publisher
http://jssidoi.org/esc/home

TOWARDS FOOD SECURITY AND SUSTAINABLE DEVELOPMENT THROUGH ENHANCING EFFICIENCY OF GRAIN INDUSTRY*

Kanat Tireuov[1], Salima Mizanbekova[2], Bakhyt Kalykova[3], Gulmira Nurmanbekova[4]

[1,2,3,4] Kazakh National Agrarian University, Abay Avenue 8, Almaty, The Republic of Kazakhstan

E-mails: nurmanbekova_g@mail.ru

Received 27 February 2018; accepted 20 August 2018; published 30 September 2018

Abstract. The new situation of Kazakhstan's participation in the world grain market, which requires scientific generalization, is connected with the transformation of the country's trade turnover from interregional to interstate. In this connection, it is objectively necessary to scientifically and methodically substantiate the system of inter-branch cooperation between enterprises for the production and sale of grain and grain processing products in order to ensure stable provision of demand for them in the regions of the country with minimum costs and export it to foreign markets. The problem of increasing the efficiency of the use of grain requires a comprehensive reduction in its consumption across all consumption channels: on seeds, when processed into flour and cereals, for forage purposes. The paramount importance of effective inter-industry cooperation between grain sub-sector organizations is determined by the leading role of grain in the economy of the agro-industrial complex, food security, and the formation of state, interstate and interregional economic ties of the country. In the current situation, the stable functioning of the grain market should be carried out on the basis of a combination of market mechanisms with state regulation tools and targeted support of its subjects.

Keywords: food security; sustainable development; interindustry interaction; grain products' sub-complex; grain market; state regulation; economic relations; innovations; grain storage; methods; methodology; tools; mechanism; The Republic of Kazakhstan

Reference to this paper should be made as follows: Tireuov, K.; Mizanbekova, S.; Kalykova, B.; Nurmanbekova, G. 2018. Towards food security and sustainable development through enhancing efficiency of grain industry, Enterpreneurship *and Sustainability Issues* 6(1): 446-455. http://doi.org/10.9770/jesi.2018.6.1(27)

JEL Classifications: O1, Q1

Additional disciplines (besides field of economics reflected in JEL classifications): biochemistry; ecology and environment

* *The research is supported by a project" Inter-sectoral economic interaction of enterprises (organizations) of the grain products sub-complex in the conditions of the contemporary agro-industrial policy" financed by Ministry of Education and Science of The Republic of Kazakhstan*

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

1. Introduction

Sustainable development of countries embraces array of facets among food security plays one of the most important roles (e.g.; Bilan et al., 2017; Svetlanská et al. 2017; Skrypnyk et al., 2018; Tvaronavičienė, 2018).

For Kazakhstan, the development of inter-sectoral economic interaction of the grain product sub-complex has a special role in connection with the strategic importance of grain and grain products as basic food products, raw materials for processing industry and livestock, a resource for state reserves and the main commodity in demand on world markets. In the development of the grain market, interbranch economic relations on the sale of grain and grain products. A new, requiring scientific generalization, the situation of Kazakhstan's participation in the world grain market is connected with the formation of sovereign states and the transformation of trade turnover between them from interregional to interstate. The existing form of interbranch relations of agricultural producers, organizations of storage, processing, trade, intermediary structures and infrastructure links, does not contribute to the achievement of a synergetic effect, ensuring the sustainability of management and increasing the competitiveness of products, weakly orientates the production functional process for implementing the strategy of import substitution in the agrifood sector. It is also necessary to meet the requirements of Kazakhstan's scientific recommendations on the formation of a system of state regulation of the interstate and interregional grain market (Tireuov, 2016a, 2016b). The structure of the grain product sub-complex is determined by the production of cereals in agriculture, the purchase of grain and it's processing in industries (flour, cereals, food and feed). In modern conditions, systemic problems that were manifested in the early 1990s and remain in the new century remain unresolved. The most important of these are the low level of profitability of agricultural producers, a large number of intermediaries, the unsatisfactory condition of the material and technical base of infrastructure enterprises, the underutilization of production capacities, the stagnation of domestic machinery for the food industry and agriculture.

2. Methods of research

Grain products subcomplex. Zernoproduktny subcomplex of the republic represents a vertically integrated structure, its organizational and production relations are characterized by insufficient balance and uneven pace of development of complex-forming industries. Especially low rates of development have developed in its processing and infrastructure spheres. This involves large losses of grain and grain products. Annually at the joints of the industries engaged in the production of grain, and carrying out its storage and processing, up to 20% of the harvested crop is lost. The main causes of losses are incomplete use of available raw materials, territorial disconnection of technologically interconnected industries. Hence, there are unreasonable inter-regional and interstate transportation of raw materials and products, associated with high transport costs and losses. The existing economic mechanism of the subcomplex does not meet the needs of the developing market economy and does not ensure coordination, coherence and necessary docking of all links in the production of final products, which ultimately leads to destabilization of the consumer market of food products. Forming a significant part of the fund of grain resources, the republic covers its needs for finished products at the expense of its own production by 90-95%. In the structure of the grain produced in the republic, the greatest proportion is wheat, mainly of strong and hard varieties, for cultivation of which favorable soil-climatic conditions have developed in Kazakhstan. However, unreasonable location of production and purchase of wheat in the regions, without taking into account zonal features led to the placement of crops and the formation of forage crops in the republic according to the residual principle. This caused a disproportion between the funds of food and feed grain. At a level of supply with food grains exceeding the norm, the need for fodder is satisfied only by 80%. The experience of countries operating on the basis of developed commodity production shows that the mechanism of the open

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

market can not by itself fully coordinate the activities of industries that are interrelated in the process of production of ready-to-use final products (Tireuov, 2016a, 2016b).

As stabilizing measures aimed at weakening the spontaneity of the market, direct long-term ties between isolated and economically independent commodity producers are implemented, which are realized on the basis of orders of the society and mutual obligations for the supply of specialized products, balanced in time, range and quality. The target orientation of the subcomplex in the process of harmonization of production, technological and market programs calls for deepening specialization in the production of a certain group of goods from grain taking into account demand (structure and volume of needs) and market conditions. Integration of industries for the production of final products from grain resources within the framework of the subcomplex, their functioning as an integrated production and economic system will contribute to the improvement of production technology, its organization, the regulation of economic relations of partners, the distribution of resources between them in the priority development of technological links that inhibit production growth final products. The branch (grain) market, in turn, developing the mechanism of adaptation of production to changing demand, stimulating competition among enterprises, will purposefully regulate the activities of all the links included in the subcomplex, which will allow to establish optimal inter-industry proportions and to form on this basis an effective structure providing maximum efficiency with minimal total costs and ensure export of grain and grain products (Altukhov,2015).

3. The discussion of the results

As is well known, they are used for the production of flour, cereals and mixed fodder, for feeding cattle and poultry in unprocessed form, for seeds, for technical processing. At the flour-grinding and cereal enterprises of the country, the yield of flour and croup of high varieties is much lower than in developed countries. Most of the feed grain in the country is fed to livestock and poultry in its pure form, despite the high efficiency of its use in the processed form in the composition of mixed fodders.The problem of improving the efficiency of the use of grain requires a reduction in its consumption across all consumption channels: on seeds, in processing for flour and cereals, for forage purposes. Its solution is adversely affected by the lack of the formation of an effectively functioning market for grain and grain products. Issues of economic relations between the grain sub-sector: the provision of mutual services by the grain elevator industry and grain producers, as well as the complex of agricultural relations with the flour-grinding and feed milling industry, the terms of export supplies in the economic literature are not fully covered. They are determined by the formation of the agrarian market as part of the world interstate and regional markets; transformation of forms of ownership; the new economic role of the state in the conditions of its transition from administrative to economic measures of influence on production and distribution of products of branches (Kaliev, Akimbekova, 2015). However, in the conditions of a market economy, the establishment of economic relations is hampered by the surviving monopoly of industries, the underdevelopment of the labor and capital market, which impedes changes in interindustry proportions, the disorder of the financial and credit system, and the violation of established territorial ties. In this regard, specific state measures are needed to regulate inter-industry economic relations, and complex scientific research should be carried out for their justification (Zakashevsky, 2017).

The production of grain is the most priority sector in the development of agriculture in Kazakhstan. It occupies one of the leading places in the agro-industrial complex and in the whole in the economy of Kazakhstan. In Kazakhstan, more than 80% of all sown areas are accounted for by grain crops. The main grain production is concentrated in Northern Kazakhstan.Favorable natural conditions in this region make it possible to obtain high and stable grain yields, first of all, high-gluten food wheat, which is in high demand on world markets as an improver for the baking properties of flour. The aggregate share of the northern regions of Kazakhstan (Akmola, Kostanay, North Kazakhstan) in the total grain production is 75%. According to average data, over the past five

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

years, the annual carryover stocks of grain are about 14 million tons. According to the forecasts of the Food and Agriculture Organization of the United Nations (FAO), the growth of global wheat production until 2020, expected at 11%. Kazakhstan will increase grain production by 40% mainly due to the increase in yields. The growth of global production of fodder cereals will go at an accelerating rate in relation to food crops, by about 20% (Moldashev, 2016:7).

As of May 2018, the reserves of grain and leguminous crops in Kazakhstan amounted to 9.462 million tons, including 1.652 million tons in peasant (farm) households, of which wheat 7,975 million tons, of which 6,088 million tons tons - food, 1.345 million tons - for seeds and 542 thousand tons - forage. As analysis of the role of the state in the grain market showed, state intervention in this sphere is to some extent present in all countries, but not everywhere it is done with the same efficiency. Let us dwell in more detail on the foreign experience of state regulation of agricultural production. Despite the principles of the free market, the need for state intervention in the agricultural production process is due to the following reasons:

1. In the conditions of technical progress and intensification of agricultural production, on the one hand, there is a significant need for capital, on the other hand, there is a relatively low return on capital, which is explained by the specifics of the industry: the spatial dispersion of the economy, the seasonality of work, the variety of forms of activity, duration of the use of equipment during the year. This indicates that agricultural production is a more capital-intensive industry in comparison with other branches of the national economy. At the same time, due to objective reasons and nature of production, the contribution of the industry to the gross national product per worker, the profitability of production and labor productivity in agriculture are lower than in other industries.
2. In agriculture, the difference in terms of costs and production is reached in crop production - 10-12 months, and in livestock - 2 years or more. In such conditions, agriculture cannot compete with other branches of the national economy.
3. Agriculture is a special branch that is connected with all spheres of economic activity and depends on natural natural processes. This, in turn, requires the preservation of the terrain and the natural environment, landscape, ecology, securing the population in historical habitats, maintaining the traditional way of life.
4. The efficiency of agricultural production and the collection of grain depend largely on the natural and climatic conditions, the timing of sowing and harvesting.
5. Agricultural production is relatively inelastic depending on prices, especially if price fluctuations are short-term. Demand for food is poorly elastic, depending on price fluctuations. The population is relatively stable in consuming basic foodstuffs, and only with a sharp increase in the prices of individual products and a decrease in real incomes it goes to a forced reduction in consumption. There are differences in the level of elasticity of demand, depending on prices and incomes: the greatest changes occur in meat and meat products, the smallest in bread, potatoes, and milk. There is a time lag between price changes and the corresponding reaction of agricultural production in the fund-producing industries, as well as in processing, agroservice,
6. There is a problem of land ownership. Land is not only the main means of production in agriculture, it is also a territorial factor of statehood, national self-determination, a spatial basis for the functioning of the entire national economy, a pantry of minerals, a special object of social relations. The refusal of the state from power over land can engender corruption in the land market, which is fraught not only with the Food, but also with the national security of the country.
7. In the agricultural industry, the effect of intensification factors is slowed down: fertilizers, land reclamation, land reclamation, innovative technologies yield returns at a certain time interval.
8. Close ties in the grain market lead to a high correlation between the efficiency of the entire agricultural cycle and the need to change production. A whole complex of state measures of an economic and administrative nature was created to maintain market equilibrium and stabilize agricultural production, which cannot be solved by traditional market mechanisms.

The revealed features of the functioning of the agrarian sphere of the economy show that this sphere is objectively

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

unable to compete with other branches of the national economy, this requires a different attitude to agriculture on the part of the power structures. To equalize the social conditions and the quality of life of urban and rural populations, the governments of developed countries provide financial, organizational and political support to the industry, which is regarded as an obligatory and unconditional element of public policy (Dnishev, 2015: 532 p.).

As the study showed, state regulation of agriculture abroad is a complex mechanism that includes instruments for influencing farmers' incomes, the structure of agricultural production, the agrarian market, the social structure of the village, inter-industry and inter-farm relations with the aim of creating stable economic, legal and social conditions for development agriculture, meeting the needs of the population in quality food at socially acceptable prices, protecting the environment fluidized bed (Mizanbekova S., 2017:45). Currently, the main content of the agrarian policy of most economically developed countries is state support for the agricultural sector through various subsidies, subsidies and benefits. The measures of direct state subsidies include the support of farmers' incomes, which consists of: direct state compensatory payments; payments for damage from natural disasters; payments for damage associated with the reorganization of production (payments for reducing the acreage, forced slaughter of cattle, etc.).
Measures of indirect state regulation of the agroindustrial complex include:
1. Price intervention on the food market by supporting domestic prices for agricultural products, setting quotas and tariffs, setting taxes on the export and import of food.
2. Compensation of the costs of agricultural producers for the acquisition of means of production by granting subsidies for the purchase of fertilizers, pesticides and forages, payment of interest on loans received, payments for property insurance.
3. Assistance to the development of the market, providing for the allocation of public funds for the development and implementation of market-based programs, subsidies for the storage of goods and transport operations for the transport of products.
4. Assistance to the development of industrial infrastructure, which involves the allocation of public funds for long-term activities that ensure the growth of production efficiency - subsidies for the construction of production facilities, irrigation projects, land reclamation, and to promote the establishment of farmers' associations.

In countries with developed market economies, there is an active state intervention in the formation and regulation of prices, which provides: the establishment of the upper and lower limits of price fluctuations and the indicative or conditional price that the state seeks to support; buying or selling non-perishable goods for the purpose of commodity intervention and maintaining the desired price level. One of the most important indicators of state regulation of agriculture in developed countries is the level of budgetary support for farm prices for manufactured products. This indicator is characterized by the ratio of all price and non-price budgetary subsidies for the production and sale (including export) of a particular type of agricultural products to its farm price. The study confirmed that the national subsidies are provided within the framework of a pan-European subsidy policy in strict accordance with its principles. Any other assistance (price interventions (surcharges to prices), regulation of production volumes, high compensation for export products), which creates the most favorable conditions within a country, is prohibited. At the same time, national governments can participate in financing and carrying out measures to improve the quality of products, ensure veterinary supervision, introduce scientific and technological progress, protect the environment, stimulate production in so-called problem areas, ensure minimum income for smallholders. Budget support can be provided by both EU member states and their autonomous entities (autonomous regions of Italy, departments and districts of France, counties in Germany) or federal states (German lands) that have their budgets (income from taxes). However, it was determined that the absolute amount of subsidies for investments should not exceed a given amount. Despite the fact that the national agrarian policy in the EU countries is a continuation of the Uniform Agricultural Policy, there are significant differences in the directions and methods of financing agriculture. For example, in support of production and markets, in addition to the EU system, Denmark spends a third of its agricultural budget, Britain and Ireland, respectively, 15 and 20%.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

Almost all countries spend half of their national agricultural budgets on structural policy (this includes modernization and consolidation of farms, improvement of land and other agricultural resources, improvement of farmers' operations, reduction of production costs and development of unfavorable areas). At the same time, there are significant differences in these areas of expenditure. For example, the UK directs almost a third of its agricultural budget to the modernization programs, while the Netherlands and Luxembourg - less than 10%. In general, in the EU countries, an average of 10% of agrarian budgets are channeled to support start-up farmers, including 25% in France, in Britain and Ireland this item is insignificant. On the budget programs "Research and development" on the average for the EU is sent about 10%, and in the Netherlands - almost 30% of the budget (Mizanbekova, Bogomolova, 2015; Mizanbekova, Bogomolova, 2017).

The US also subsidizes agriculture. Budgetary spending on agriculture depends on the economic situation - during the crisis years their importance increases sharply, in more stable periods the level of state subsidies is significantly reduced. Budget funds are allocated for the financing of the following programs: agricultural research; organization of marketing and information about markets and prices; crediting; conservation and seizure of land; support of prices, purchase, compensation payments; support of farming supply and marketing cooperatives, market orders; subsidizing food; export subsidies; international food aid. It should be noted that in the structure of budget expenditures allocated to agriculture, the main are two areas: income stabilization programs (accounting for about 60% of budget expenditures under the item "Agriculture"); program of agricultural research and science services. The largest share of aid (about 70% of budget funds) is received by relatively large farms that ensure high production efficiency, and in fact, one-third of American farms are covered by budgetary financing. As the research has shown, in all major grain-producing countries the grain economy is subsidized. The EU countries, the USA, Canada, Japan, India are investing heavily in improving grain production technologies. This allows to save 52.7% of potential crop losses in the EU countries, the United States - 44%. The foregoing allows us to conclude that state regulation of the agro-industrial sector of the economy through comprehensive support of agricultural producers is a priority direction of the agrarian policy of most developed countries. At the same time, various economic levers are used (payments from the budget, compensation of production costs, price support, subsidies for improving the production structure, development and implementation of various programs), the action of which allows creating favorable conditions for ensuring sustainable functioning of the agro-industrial complex and forming an effective social and production infrastructure in the countryside.

Since the production of grain is at the heart of the technological chain "agriculture - grain-processing enterprises - grain processing", it must be subject to state regulation. The support of agricultural producers, taking into account the rational elements of the foreign experience of state regulation, taking into account the national peculiarities and the economic situation, is especially important when Kazakhstan joins and functions in the conditions of the WTO and tightens competition for the domestic grain and bakery market (Nurmanbekova, 2015: p. 44). At the same time, state regulation in the technological chain under consideration should be multi-purpose, maintaining stability, efficiency, democracy and fairness of the functioning of its participants, regardless of the form of ownership and sphere of activity. Summarizing the opinions of domestic and foreign scientists, it seems fair to strengthen the organizing and controlling intervention of the state only taking into account market self-regulation. State regulation of market conditions within the globalization of the economy, taking into account the specified principles, will create conditions for the sustainable development of the civilized domestic grain market and the mobilization of Kazakhstan's export potential (Nurmanbekova, 2015:p. 44). Prospects for inter-industry cooperation are associated with the possibility of further improving technology. The potential of intersectoral interaction should be considered proceeding from the fact that any specific technological process should be considered as part of a more complex process and as an aggregate of less complex technological processes, each of which is capable of both creating unique competitive advantages and leveling the advantages of other processes. Along with the specialization and differentiation of industries, processes of cooperation and integration

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

are taking place, which leads to the formation of stable production links between industries and the creation of inter-branch complexes. Almost every science-intensive branch can be considered as an interbranch complex, which is an integration structure that is characterized by the interaction of various industries and their elements, different stages of production and distribution of products.

Innovative activity is a strategic direction for the development of the grain product subcomplex of Kazakhstan. The ways of transfer to the innovation-investment model of development can be considered in the following directions: innovations of technical and technological nature, innovations in the biological factor. Without an accelerated transition to an innovative development path in the context of the globalization of economic relations aggravating competition in the world agro-food market, the tasks of agro-industrial policy cannot be resolved.Innovative activity refers to the type of activity associated with the transformation of an idea into a new or improved product, a new or improved technological process used in practice. Pilot projects are being implemented in a number of regions. In Kazakhstan (Akmola region) a new granary of the agrofirm "Aktyk" with a capacity of up to 30 thousand tons was launched. The construction of the granary was financed from the funds of the National Fund. Thanks to the new elevator, the agrofirm will be able to store and store large quantities of grain, bring them to the conditioning state without loss of consumer properties for a long period of time. The granary is intended for receiving grain from motor transport, cleaning and storage in silos. The bakery does not only accept, dry and ship wheat, but also oilseeds, the price of oilseeds is much higher than for wheat. About 1,000 hectares of flax are sown with the possibility of receiving products at a new grain receiving point. This granary is just one of many erected elevators in Kazakhstan with the financing of KazAgroFinance JSC. In total, since 2009, JSC "KazAgroFinance" approved 18 projects of grain storage facilities with a capacity of 275,000 tons for a total of KZT10, 850 million. Since the beginning of this year, two grain storage facilities with a capacity of 24,000 tons have been put into operation. Five grain storage facilities with a total storage capacity of 143,000 tons are planned to be commissioned by the end of the year. A new elevator with a design capacity of 120,000 tons is operating in Petropavlovsk (Kazakhstan) -Export »An elevator per hour can take more than 600 tons of grain. The total capacity of the granary is 120 thousand tons. The elevator uses the latest technologies with the use of American-made equipment that allows to provide the whole range of services: reception, processing, drying, storage and shipment of grain and oilseeds.

New innovative energy-saving technologies are used, which reduce energy consumption by 3-4 times. With the launch of the elevator, 96 new jobs were opened. In total in the North Kazakhstan region of Kazakhstan there are more than 50 licensed grain receiving enterprises, the total capacity of which is about 3.5 million tons. In Kazakhstan (Kostanai oblast) the company Agro-Bio-Auliekol LLP plans to build a plant for deep processing of wheat worth about KZT1.5 bn., an additional land plot with a railway dead-end and a land plot for filtration fields are provided. Agro Bio Auliekol LLP has already launched an innovative project to create a whole biotechnological complex for deep processing of wheat and wheat straw with a volume of more than 10,000 tons per year, producing modified starch, dry gluten, glucose-fructose syrup and mixed fodder with increasing protein content . In the situation of falling grain prices, due to the limited domestic and export markets, the way out for the grain-growing regions is the development of deep grain processing. This will also reduce the dependence of grain growing regions on fluctuations in world wheat prices. Grain-producing regions of the country produce only three types of basic grain-processing products - grain, flour and bran, while the introduction of biotechnological processes will produce 100% of wheat processing and produce about 19 types of highly liquid products. This will raise the economy of the grain-growing regions to a new level, with the opening of new jobs, science-intensive industries. The development of new directions in the processing of wheat leads to conservation and stimulation in the expansion of sown areas, which will not only preserve but also increase the employment of the rural population. There will be tangible results: if a ton of wheat is sold at 50,000 tenge, when processing the same ton of wheat, up to 618 thousand tenge. The plans to open an experimental shop for the production of bio-feed. The use of full-fledged developments in the field of biotechnology will make it possible to obtain high-nutritional

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(27)

compound feeds containing protein (protein) over 20%, raw fat 8%, crude fiber 25%, deficient amino acid "lysine" 7% and other macro- and microelements from straw. The cost of such bio-feeds will not exceed the existing prices in the market of feed mixes and mixed fodders, and, unlike the approximate "premixes", will be much lower. This type of feed production is environmentally friendly, cost-effective and has a social background (in view of the high protein content, the growth in live livestock is accelerating without increasing costs, which will positively affect the economic component of the population). The Belarusian National Biotechnology Corporation (BNBK) is embarking on a large-scale investment project "Organization of a high-tech agro-industrial full cycle production for 2016-2032. The project includes the construction and commissioning of a plant for the production of lysine, plants for the production of threonine and tryptophan, factories for the production of mixed fodders, a complex of grain storage facilities, an auto plant, an administrative complex, a research laboratory, an electrical substation, a steam turbine plant, engineering and transport infrastructure. In Kazakhstan, the state program "Digital Kazakhstan", strategically important for the country, was adopted to prepare the economy for the fourth industrial revolution. In Aktyubinsk Oblast, a pilot project "Farmers Service Center" will be implemented with the use of digital technologies. New technologies are used for crops and harvesting. The main innovation is the transition to the electronic form of the issue of the grain receipt and the use of the information system by the grain market entities. This system will automate the accounting of grain receipts, their holders and operations with grain receipts. The first grain receipts from the Aktyubinsk region have been issued. The volume of output was 2 thousand tons of fodder grain, or about 80 million tenge at market value. Elevator in Astana issued its first grain receipts for a total volume of 20 thousand tons in the category of food grains. In the North-Kazakhstan region, grain receipts with a volume of 2.5 thousand tons were exported. An electronic map of granaries has also been put into operation, on it in the online mode the loaded and empty grain storage tanks are displayed, their maximum technical capacity. In addition, the system has implemented the opportunity to send an electronic receipt to the electronic trading platform of the State Register, on this site, the sale of objects of the second wave of privatization and all state assets are exhibited. In addition, participants in the grain market can take advantage of the option "delivery versus payment" when buying and selling grain receipts. This option is taken over from the securities market, and an electronic digital receipt in accordance with the adopted legislation is precisely a security. Thus, the grain receipt itself will be a payment instrument and a solid guaranteed currency. The Kazakhstan model of grain receipts was recognized by international experts as the best among the CIS countries and Eastern Europe using this financial instrument. Cereal receipts have long and successfully been used in the USA, Canada, Hungary, Bulgaria, and Russia. The introduction of grain receipts in Kazakhstan and, in particular, the creation of a Guarantee Fund for grain obligations, in addition to streamlining the system for the preservation and sale of grain, formed the basis for a significant attraction of financial resources to the grain economy. One of the directions is the creation of Kazakh-Russian joint centers for agricultural innovation in cooperation in the field of mutual investment, the operation of cross-border joint ventures, the construction of production chains, and the provision of high-quality transport and logistics infrastructure. Kazakhstan is completing the construction of the corridor Western Europe - Western China, going through Russia. Thanks to this, centers could be set up to expand food supplies using the resources of the Eurasian Development Bank. Of the Bank's 12 projects financed this year, 10 are in agriculture.

Conclusions

The state traditionally has a key role in the financial provision of the innovation process - the basis for modernizing the economy. It itself is a major, and in a number of countries and a major investor in new knowledge and technology. 21 The share of the state in domestic spending on research and development is 33% in the EU countries, the USA - 28, China - 25, Brazil - 50, India - 75%. In addition, the state acts as a catalyst for innovative business activity, creating for it through various financial and fiscal mechanisms stimulating conditions that increase the efficiency of investments in the creation of high-tech products. There is a need to

further improve the forms and instruments of state support, new financial mechanisms that make it possible to facilitate the commercialization of scientific knowledge, grant programs for conducting initial research on projects, and the expansion of the practice of setting up venture funds that invest in companies at the start-up phase. Unconditional priority remains the staffing of economic entities and the promotion of their products to the sales markets.

References

Altukhov, A.I.; Nechaev, V.I. 2015. Economic problems of innovative development of the grain products subcomplex of Russia. Monograph. Publishing house Nasirddinova VV, 477 p.

Bilan, Y.; Zos-Kior, M.; Nitsenko, V.; Sinelnikau, U.; Ilin, V. 2017. Social component in sustainable management of land resources, Journal of Security and Sustainability Issues 7(2): 287-300. https://doi.org/10.9770/jssi.2017.7.2(9)

Chow, K.V. 2018. Manufacturing Compounded Feeds in Developing CountriesFood and Agriculture Organization Rome, Italy.

Development of innovations and progressive technological structures in the economy of Kazakhstan in the conditions of industrial modernization: institutions, mechanisms and priorities / Ed. F. Dnishev, F. Alzhanova. - Vienna, Austria: Association for Advanced Studies and Higher Education "East-West", 2015. 532 p.

Epifanova, T.V.; Skvortsova, T.A.; Parshina, EA. 2017. Influence of clustering on innovation development of business structures in region's economy International Journal of Trade and Global Markets 10(2-3): 133-141.

Kaliev, G.A.; Akimbekova, G.U. 2015. Priority directions of development of processing of agricultural products in the Republic of Kazakhstan, Problems of the agro market 1: 5-10.

Kovács, J.K.; Zoltán, E.S. 2017. Rural Enterprise Hub Supporting Rural Entrepreneurship and Innovation-Case Studies from Hungary, European Countryside 9(3): 473-485.

Mizanbekova, S.K.; Bogomolova, I.P. 2015. Innovations as an instrument for sustainable development of the elevator industry in Kazakhstan and Russia. G. Economics, innovation, quality management. Voronezh State University of Engineering Technologies 4(13): 92-96.

Mizanbekova, S.K.; Bogomolova, I.P. 2017. Directions for the formation of balanced relations between the organizations of the grain product subcomplex The International Agricultural Journal 5: 45-49.

Moldashev, A.B. 2016. AIC of Kazakhstan: the problems of development and the search for their solution, Problems of the agro-market 3: 7 -13.

Nekrasov, R.; Anikinetal, A. 2018. Principles of rationing for compound feed concentrates in diets of highproducing cows, 2: 30–34
Nurmanbekova G.K. 2015. The competitiveness of grain as a factor in the effective development of grain production. J. Problems of the agro-market 15: 44-47.

Rankin, M.; Nogales, E.G.; Santacoloma, P.; Mhlanga, N.; Rizzo, C. 2016. Public–private partnerships for agribusiness development. Food and Agriculture Organization of The United Nations, Rome, 2016.

Rankin, M.; Nogales, E.G.; Santacoloma, P.; Mhlanga, N.; Rizzo, C.; Leitão, J.; Sarmento, E.D.E.; Aleluia, J. 2017. Public–Private Partnerships for Agricultural Transformation – Trends and Lessons from Developing Countries.Published: 6 December 2017. by Emerald (MCB UP) in The Emerald Handbook of Public–Private Partnerships in Developing and Emerging Economies, p. 191-219 https://doi.org/10.1108/978-1-78714-493-420171007

Skrypnyk, A. V.; Tkachuk, V. A.; Andruschenko, V. M.; Bukin, E. 2018. Sustainable development facets: farmland and market demand estimation, Journal of Security and Sustainability Issues 7(3): 513-525. https://doi.org/10.9770/jssi.2018.7.3(11)

Svetlanská, T.; Turčeková, N.; Adamičková, I.; Skalský, R. 2017. Food security facets: case of Slovakia regions, Journal of Security and Sustainability Issues 7(2): 311-320. https://doi.org/10.9770/jssi.2017.7.2(11)

Tireuov K.M. 2016a. Agribusiness in a globalized economy. Monograph. Almaty, 2016, 229 p.

Tireuov KM 2016b. AIC of Kazakhstan: the organization of innovative activity. Monograph. Almaty, 2016, 162 p.

Tvaronavičienė, M. 2018. Toward efficient policy making: forecasts of vulnerability to external global threats, Journal of Security and Sustainability Issues 7(3): 591-600. https://doi.org/10.9770/jssi.2018.7.3(18)

Wu, J.; Zhuo, S.; Wu, Z. 2017. National innovation system, social entrepreneurship, and rural economic growth in China, Technological Forecasting and Social Change 121: 238-250.

Zakashevsky V., Charykova O., Kvasov A. 2017. Strategic development of the socio-economic development of the region's agro-industrial complex. J. APK: Economics, Management 12: 13 – 24

Aknowledgements

The research is supported by a project" Inter-sectoral economic interaction of enterprises (organizations) of the grain products sub-complex in the conditions of the contemporary agro-industrial policy" financed by Ministry of Education and Science of The Republic of Kazakhstan

Register for an ORCID ID:
https://orcid.org/register

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

Publisher
http://jssidoi.org/esc/home

FINANCIAL, ORGANISATIONAL AND INFORMATIVE INVOLVEMENT OF THE SOCIETY IN SOCIAL INNOVATION PROCESSES IN LATVIA *

Karine Oganisjana[1], Svetlana Surikova[2], Konstantins Kozlovskis[3], Anna Svirina[4]

[1,3] Riga Technical University, 6 Kalnciema Street, Riga, Latvia,
[2] University of Latvia, 1 Imantas 7 linija, Riga, Latvia
[4] Kazan National Research Technical University, K. Marx St., Kazan, Russia

E-mails:[1] Karine.Oganisjana@rtu.lv; [2] svetlana.surikova@lu.lv; [1] Konstantins.Kozlovskis@rtu.lv; [3]anna_svirina@list.ru

Received 30 March 2018; accepted 25 August 2018; published 30 September 2018

Abstract. Social innovation brings to inclusion and wellbeing, improving the quality of life and socio-economic performance and enhancing the society's collective power and resources. Therefore, it is of utmost importance to promote social innovation processes in any society, providing research for getting the understanding of different aspects of it, including the main actors and the extent to which they are involved in social innovation. The research presented in this paper reveals the main stakeholders of social innovation and analyses the methodology elaborated by the authors for determining the involvement of the society in social innovation processes at financial, organisational and informative levels. Corresponding indices defined and determined for the case of Latvia reveal that the level of overall involvement of the society in social innovation processes here is lower than average.

Keywords: Social innovation, involvement in social innovation, financial involvement, informative involvement, organisational involvement, stakeholders in social innovation, Latvia

Reference to this paper should be made as follows: Oganisjana, K., Surikova, S., Kozlovskis, K., & Svirina, A. (2018). Financial, organisational and informative involvement of the society in social innovation processes in Latvia, *Entrepreneurship and Sustainability Issues*, 6(1): 456-471. http://doi.org/10.9770/jesi.2018.6.1(28)

JEL Classifications: O35

1. Introduction

* *The research is conducted within the project 5.2.7. "Involvement of the society in social innovation for providing sustainable development of Latvia" as part of the National Research Program 5.2. "Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)".*

Social innovation is argued to be a tool for handling major societal challenges mobilising local actors, providing new and more efficient answers to meet growing social needs, achieving faster economic growth and enhancing productivity of public services. Social innovation is capable of integrating various stakeholders to tackle topical challenges jointly, through new ways of working together and involving users, exploiting fewer resources and creating important improvements at relatively low cost (European Commission, 2013; European Union, 2012a, 2012b). Being a relatively new concept in Latvia, social innovation needs thorough research in order to reveal the theoretical and practical basis for its development and scaling in the Latvian reality provoking the society and making social innovation a regular practice. Therefore, the project "Involvement of the society in social innovation for providing sustainable development of Latvia" was carried out within the National Research Program 5.2. "Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)". The papers already published in different stages of this project provide an insight into: the interdisciplinary research approach realized by the research team from the integrated perspective of economics, management and education (Oganisjana, Surikova & Grīnberga-Zālīte, 2016); the barriers to social innovation and ways of overcoming them in Latvia (Oganisjana, Eremina, Gvatua, Kabwende & Chukwu, 2017); how to engage universities in social innovation research (Oganisjana, Svirina, Surikova, Grīnberga-Zālīte & Kozlovskis, 2017); scenarios for promotion of social innovation in Latvia (Dobele, Grinberga-Zalite & Kelle, 2015); the role of social innovation in the promotion of sustainable development of the contemporary Latvian society (Oganisjana & Surikova, 2015); the factors influencing social innovation processes in Latvia (Oganisjana, Surikova, & Laizāns, 2015); the role of education in promoting social innovation processes in the society (Surikova, Oganisjana & Grinberga-Zalite, 2015), etc. This part of the research has revealed three dimensions of support and involvement of the society in social innovation processes. That has brought to the understanding of the necessity to introduce indices of financial, informative and organisational involvement of stakeholders in social innovation processes. The paper presents the approach which was elaborated and applied to define these indices together with the methodology worked out for determining them. Based on the interviews of social innovation projects, not only indices of financial, informative and organisational involvement of stakeholders were determined for the Latvian context, but also an aggregated index was calculated integrating all these dimensions in one and giving insight into the overall involvement of the society in social innovation processes.

The purpose of the research is to elaborate methodology for determining financial, organisational and informative involvement of the society in social innovation processes and applying that to the Latvian context.

Research questions:

1. Who are the stakeholders in social innovation?
2. How to evaluate stakeholders' financial, organisational and informative involvement in the realisation of social innovation projects?

What is the level of the society's financial, organisational, informative and overall involvement in social innovation processes in Latvia?

2. The theoretical framework of the research

In the European Commission's "Guide to social innovation", it is argued that social innovation typically goes through stages starting as ideas, which may then be piloted or prototyped for being implemented as a new venture or as a new policy within an existing institution and scaled up in the final stage, making a real impact and becoming part of the norm (European Commission, 2013). The spiral model of social innovation shows its four stages:

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

1) ideas;
2) prototyping or piloting;
3) implementation;
4) scaling (European Commission, 2013: 9)

Based on the literature analysis, the project team have come to the conclusion that the starting point of social innovation is not just an idea but rather an urgent social problem which either hasn't been solved yet or is solved partly or not very effectively (Phills, Deiglmeier & Miller, 2008; OECD, 2010; Dover, 2011; Minks, 2011; Mahmuda, Baskaran & Pancholi, 2014; Howaldt et al., 2014, etc.). The research team defines social innovation as better, more efficient and effective solutions of social problems (Phills, Deiglmeier & Miller, 2008; Howaldt & Schwarz, 2010; Minks, 2011; Cajaiba-Santana, 2013; Klievink & Janssen, 2014). In the result of social innovation, new sustainable social practices and culture including new organisations, new policy, new technological solutions, value system, mentality, etc. could be created (Howaldt & Schwarz, 2010, The Young Foundation, 2012a; Lundstrom & Zhou, 2011; Davies, 2014; Howaldt et al., 2014).

The specific aspect about social innovation is co-organisation and co-thinking of the stakeholders for diagnosing the social problems in the local community or in the country with further prioritization for finalizing the problem to be solved (The Young Foundation, 2012a, 2012b; Davies & Simon, 2012). The process of social innovation has been pursued at three levels:

- delegating the role of generating social innovation to individual entrepreneur (micro),
- through the public/private partnerships (meso),
- innovating the patterns of social interaction by governments and institutions for generating social value through policies, laws, and institutional reforms (macro) (Bonifacio, 2014).

In the stage of the solution of the social problem the parties involved co-create best solutions via ideation, prototyping and piloting. In the course of implementation, the solution is improved or pivoted for achieving self-sustainability. Then the new practice is expanded and developed on, sometimes being replicated in one or more locations involving more people in social innovation processes (Murray, Caulier-Grice & Mulgan, 2010; The Young Foundation, 2012a, 2012b).

Therefore, the research logic and the elaboration of the materials for interviewing social innovation projects in Latvia were based on the following four stages:

1) community diagnosis of social problems and prioritization of the most urgent problem;
2) co-creation including ideation and prototyping of the most effective solution for the social problem;
3) implementation of the project;
4) scaling up of the new social practice and involving broader society in the social innovation processes.

1.1. The stakeholders of social innovation

Scientific literature focuses on different stakeholders in social innovation research depending on the peculiarities of the projects and the key problems solved. The understanding who are the stakeholders is a complex task as social innovation is concerned with the action of different sectors, overlapping spaces between them and interacting at the interfaces among all the sectors (European Union, 2012b; Davies & Simon, 2013a; Alegre & Berbegal-Mirabent, 2016). Different approaches emphasize various aspects of social innovation such as: the goals, models, tools, problems solved, outcomes and the main actors. The analysis revealed the following stakeholders in social innovation:

- social innovators, i.e. individuals or legal entities who bring together ideas, resources and tools for initiating and realising social innovation projects (European Union, 2012b; Lee, 2017; Seyfang & Smith, 2007);
- family and friends of social innovators (European Union, 2012b; Altuna, Contri, Dell'Era, Frattini & Maccarrone, 2015; Alegre & Berbegal-Mirabent, 2016);

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

- other individuals who do not belong to family and friends of social innovators (Hernandez & Cormican, 2016; Altuna et al., 2015; Lee, 2017);
- target groups, i.e. persons who gain from social innovation projects (Bund, Gerhard, Hoelscher & Mildenberger, 2015);
- public institutions or organisations (Russon Gilman, 2017; Benneworth & Cunha, 2015; European Union, 2012b; Alegre & Berbegal-Mirabent, 2016; Altuna, Contri, Dell'Era, Frattini & Maccarrone, 2015);
- municipal institutions or organisations (Alegre & Berbegal-Mirabent, 2016; Bund, Gerhard, Hoelscher, & Mildenberger, 2015; Lee, 2017; Seyfang & Smith, 2007);
- enterprises (Hernandez & Cormican, 2016; Benneworth & Cunha, 2015; European Union, 2012b; Altuna et al., 2015; Alegre & Berbegal-Mirabent, 2016; Lee, 2017);
- non-governmental organisations (Altuna et al., 2015; Alegre & Berbegal-Mirabent, 2016; Seyfang & Smith, 2007);
- educational institutions (Benneworth & Cunha, 2015; Altuna et al., 2015);
- supranational institutions or organisations of the European Union (European Union, 2012b; Bund et al., 2015).

This classification of the stakeholders served as a basis for the elaboration of the interview materials and creation of the system for the evaluation of stakeholders' involvement in social innovation processes.

1.2. Financial, informative and organisational involvement in social innovation

Society's involvement in social innovation refers to providing 1) information and resources, 2) problem solving and 3) taking and influencing decisions (Davies & Simon, 2013b). The involvement of the stakeholders in social innovation processes was revealed to be related to financial, organisational and informative dimensions of their support in the realisation of creative solutions in society's life.

Financial involvement of stakeholders. Social innovation is supported by European Structural funds (comprising the European Social Fund and the European Regional Development Fund) and Cohesion Fund to promote policies, programmes and initiatives and empower citizens and organisations to address social issues. Other sources of social innovation funding are Social banks, Commercial investment funds, Social investment funds and Venture philanthropy funds (European Union, 2012b). However, also crowdsourcing can be one of the types of funding of social innovation (Davies & Simon, 2013b); that is conditioned by its bottom-up nature and participation in it broad layers of society. A significant role in funding social innovation is played by municipalities as projects initiated by local authorities enable more long-term measures and can be better adjusted to local needs; therefore, municipalities have been admitted to be crucial initiators and driving actors of sustainable social innovation (Bund, Gerhard, Hoelscher & Mildenberger, 2015). Municipalities oversee social innovation programs and work on legislation securing funds from either government budgets or social financing (Lee, 2017). Financial support is provided also by universities which invest in activities which contribute to testing or upscaling social innovation and delivering innovative services (Benneworth & Cunha, 2015).

Informative involvement of stakeholders. Engagement of citizens in social innovation is often necessary to understand and uncover complex needs or gather ideas for new and better solutions; citizens themselves are best placed to articulate the nature of the challenges they face often becoming the source of innovative ideas (Davies & Simon, 2013b). Universities play the role of knowledge provider informing the society about the existing knowledge or creating new knowledge, as well as working with social partners to co-create new knowledge which contributes to social innovation; universities also provide advice to social innovators on how best to access external knowledge resources or who might be able to help them (Benneworth & Cunha, 2015: 518). Most powerful information providing aspect of social innovation is related to social networks which realise various

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

online-based activities, proactively leading and disseminating public opinion via utilizing new platforms for dialogue and knowledge sharing in rapidly expanding online communities (Lee, 2017).

Organisational involvement of stakeholders. According to Davis and Simon (2013b), society provides organisational support to social innovation in multiple ways in different stages of its realisation: in early stages - developing a better understanding of needs or gathering ideas for new and better solutions, and in later stages – solving problems via co-designing processes and taking and influencing decisions. A crucial organisational role is played by municipalities which establish intermediary organisations and networks for facilitating collaboration between governments and companies, as well as support local social innovators and adopt social innovation projects to foster local self-reliance, leading to the revitalization of local economies and communities (Lee, 2017). Organisational support to social innovation is rendered also by educational institutions; universities make their premises including offices, libraries and laboratories, available during social innovation processes and help to persuade third parties of the value of the social innovation and help them to adopt or invest their resources in the social innovation (Benneworth & Cunha, 2015: 518).

Based on these judgements, the empirical part of the research conducted within the project "Involvement of the society in social innovation for providing sustainable development of Latvia" was carried out for these three dimensions - financial, informative and organisational involvement of the ten groups of stakeholders in social innovation processes.

3. Research methodology

The research design was elaborated according to the four stages of social innovation analysed above. The data were collected in 2016-2017 within face-to-face or online interviews of social innovation projects in Latvia which were in different phases of their development. The empirical part of the research focuses on the following major stakeholders who participate in social innovation processes:

- social innovator (*SI*);
- family and friends of social innovators *(FF)*;
- other individuals *(IND);*
- target group (*TG*);
- public institutions (*PI*);
- municipal institutions *(MI)*;
- enterprises *(E)*;
- non-governmental organisations *(NGO)*;
- educational institutions *(EDU)*;
- European Union institutions (*EU).*

The three dimensions of the involvement of the stakeholders in social innovation processes are defined by the authors as follows:

- *financial involvement (FINI)* – any investment from any stakeholder to finance the processes related to the initiation and implementation of social innovation in real life;
- *informative involvement (INFI)* – any informative support, idea and advice from any stakeholder for raising awareness, sharing and spreading information which could help in the realization of social innovation;
- *organisational involvement (ORGI)* – any effort, care, lobbying, work, guidance, monitoring of performance and contribution into the realization of events and activities for achieving the objectives in any stage of the elaboration and realization of social innovation.

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

The involvement of the society in social innovation processes is estimated for the stakeholders using a 10-score valuation system, where "0" means "no involvement" and "10" – "full involvement". These data were collected while interviewing representatives of 115 social innovation projects – social innovators; they had to estimate the level of their own and the other stakeholders' financial, informative and organisational involvement in the realization of their projects. The scores were organized in a special matrix for each respondent separately as shown in the template (see Table 1).

Table 1. Matrix of scores of financial, informative and organisational involvement in social innovation processes (template)

		Stakeholders									
		SI	**TG**	**PI**	**MI**	**E**	**FF**	**IND**	**NGO**	**EDU**	**EU**
Dimension of involvement	**FINI**	f_1	f_2	f_3	f_4	f_5	f_6	f_7	f_8	f_9	f_{10}
	INFI	i_1	i_2	i_3	i_4	i_5	i_6	i_7	i_8	i_9	i_{10}
	ORGI	o_1	o_2	o_3	o_4	o_5	o_6	o_7	o_8	o_9	o_{10}

Source: the authors

The matrix of scores represents three sets of values grouped by the dimensions of involvement. Using the data from all the 115 matrices, indices of financial, informative and organisational involvement of stakeholders in social innovation processes were calculated. The idea of introducing indices of financial, informative and organisational involvement in social innovation processes was elaborated based on the logic and approach of calculating different macroeconomic indicators such as: Purchasing Managers' Index represented by the Institute for Supply Management (Institute for Supply Management, 2016) and German Ifo Business Climate Index introduced by Center for Economic Studies of Leibniz Institute for Economic Research at the University of Munich (CESifo Group Munich, 2016). The indices of involvement of stakeholders in social innovation processes were calculated using the following formulas:

$$Index_{FINI} = \frac{1}{nz}\sum_{j=1}^{n}\sum_{i=1}^{z} f_{i,j} \quad (1)$$

$$Index_{INFI} = \frac{1}{nz}\sum_{j=1}^{n}\sum_{i=1}^{z} i_{i,j} \quad (2)$$

$$Index_{ORGI} = \frac{1}{nz}\sum_{j=1}^{n}\sum_{i=1}^{z} o_{i,j} \quad (3)$$

where $Index_{FINI}$, $Index_{INFI}$, $Index_{ORGI}$ are the indices of involvement of the society in social innovation processes related accordingly to financial, informative and organisational involvement of stakeholders;

n – total number of interviewees (*n* = 115);
z – total number of the stakeholders (*z* = 10).

Each sth stakeholder's involvement can be estimated based on the formula:

$$Index_s = \frac{1}{3n}\sum_{i=1}^{n}\left(f_{s,i} + i_{s,i} + o_{s,i}\right) \quad (4)$$

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

To estimate the total involvement of the society in social innovation processes in Latvia taking into account the involvement of all the stakeholders in all the three dimensions of involvement, the authors suggest calculating an aggregate index (*AIndex*) represented by the grand mean shown in the following composite formula:

$$AIndex = \frac{1}{npz} \sum_{m=1}^{n} \sum_{j=1}^{p} \sum_{i=1}^{z} score_{j,i}^{m} \quad (5)$$

where p – total number of the dimensions of involvement (p = 3).

This aggregated index can be developed on in case if new categories of involvement such as: size of project, industry or sector of economy, geographical characteristics, etc. are needed to be considered.

4. The characteristics of the research sample and context

As social innovation is a newly developing reality in the Latvian society, it was a real challenge to seek out appropriate projects according to the criteria of the concept of the theory-based understanding of what social innovation is. The 115 social innovation projects (social innovators) were interviewed in the period of time from October, 2016 to April, 2017.

The projects were in different stages of their development. Some of them (28.7%) had already finished their activities by the time of the interview. There were also starters (3.5%) who hadn't functioned even for one full year (Table 2).

Table 2. The duration of the projects by the time of the interview

Duration of the project (full years)	0	1	2	3	4	5	6	7	8	9	10	11	13	14	19
Number of projects	4	25	24	16	12	6	5	8	3	5	1	3	1	1	1
Percent (%)	3.5	21.7	20.9	13.9	10.4	5.2	4.3	0.9	2.6	4.3	0.9	2.6	0.9	0.9	0.9

Source: the authors

The duration of the main body of the projects varied mainly from one year (21.7%) to four years (10.4%). However, 5.3% of the projects were with lifespan bigger than 10 years (see Table 2).

Spread over all the regions of Latvia, the social innovation projects represented mainly NGO (47.8%), enterprises (18.3%) and municipal institutions or organisations (15.7%). Social innovators from educational institutions (2.6%), public institutions or organisations (1.7%) and individuals (0.9%) were rarer than the other project holders which might indirectly speak of their being less active in social innovation processes in Latvia.

The distinct majority (55.7%) of the social innovation projects employed less than 10 people (n < 10), small sized projects (n < 50) - 26.1%, medium sized projects (n < 250) – 9.6% and big projects (n > 250) – 8.7% of the projects interviewed.
The projects covered a broad range of fields of activities: education (42.6%), tourism, entertainment and leisure (24.3%), social care (14.8%), environment and ecology (14.8%), health care (13.8%), sports (9.6%), charity

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

(8.7%), culture and arts (7.8%), ICT and other technologies (4.3%), manufacturing (3.5%), agriculture (1.7%) and other fields (11.3%). Some projects dealt with complex activities integrating two or three fields in one or overlapping some fields; in such cases social innovation projects were offered to indicate more than one field. That is the reason why, the sum of the percent of all the fields mentioned exceeds 100%.
The target groups of the interviewed social innovation projects were: children and youngsters (53.9%), people with special needs (27.8%), seniors (27.0%), families with many children (24.3%), unemployed people (15.7%) and others (55.7%). As some of the projects had multiple target groups, they mentioned more than one option; therefore, the sum of the overall percent is more than 100%.

Out of the 115 interviewees 78 projects (67.8%) stated that they had volunteers engaged in the projects. Bigger part of the respondents (59.1%) said that they had started their projects in order to solve some topical and urgent problems of their families, friends, local communities and the society as a whole, while only 21.7% of the respondents had identified some interesting ideas which motivated them to start the social innovation projects. The remaining 19.1% indicated some other reasons.

The main barriers to social innovation were pointed out to be: lack of financing (39.1%); passivity in the society (31.3%); administrative and bureaucratic barriers (31.3%); lack of openness of the society to other people's experience and collaboration (14.8%); the absence of public policy and legal framework for social innovation (13%); passivity and low level of support from stakeholders (12.2%); lack of experience in realizing social innovation projects (11.3%); lack of access to information needed (11.3%) and other barriers (18.3%). Only 12.2% of the respondents considered that they didn't have any hindrances in the realization of their projects. As some projects spoke of more than one barrier, the sum of the percent of all the barriers is more than 100%.

Having analysed the course and the style of the solution of the main problem, the respondents concluded that the problem had been solved: by the project group on their own (23.5%); in the active collaboration of all the stakeholders including the project group, external individuals and/or organisations and the target group (20.9%); by the project group in collaboration with the target group (14.8%); based on the collaboration of the project group with external individuals and/or organisations (12.2%); by the target group themselves under the facilitation of the project group (4.3%) and in another way (6.1%).

Analysing whether their projects were financially self-sustainable, 36.5% of the respondents replied positively, 37.4% considered that they were financially self-sustainable partly, 16.5% said they weren't and 9.6% gave other answers.
The answers to the question asked with the aim to spread light on the situation with scaling social innovation practices in Latvia, revealed that: 11.3% of the social innovation projects had been replicated at the level of the city / district, 2.6% - at the level of the region, 18.3% - at the national level and 18.3% - internationally. However, 17.4% replied that the project hadn't been scaled. Almost one third of the respondents (32.2%) were not aware of the further development of their practices.

The majority of the projects interviewed (90.4%) is planning to continue the realisation of their social innovation ideas, while 9.6% don't have such an intention.

5. Findings of the research

The dynamics of involvement of the society in social innovation processes in Latvia characterized by the three indices of financial, informative and organisational involvement of the stakeholders (see Figure 1) were constructed based on the calculations according to formulas (1), (2) and (3).

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

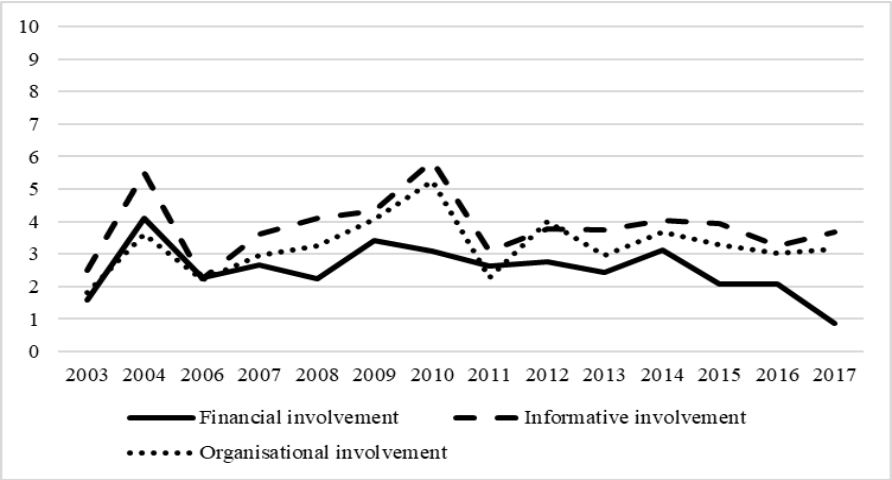


Figure 1. Dynamics of involvement of the society in social innovation processes in Latvia characterized by indices of financial, informative and organisational involvement

Source: the authors

As seen in Figure 1, informative and organisational involvements quite highly correlate with each other while financial involvement has a downtrend over the years. This tendency is revealed also in the calculation of correlation coefficients shown in the matrix in Table 3.

Table 3. Correlation matrix of financial, informative and organisational involvement in social innovation

	Financial involvement	Informative involvement	Organisational involvement
Financial involvement	1		
Informative involvement	0.62	1	
Organisational involvement	0.51	0.86	1

Source: the authors

Analysing the values of indices (see Figure 1), it can be concluded that the Latvian society does not have high level of involvement in social innovation processes:

- financial involvement index $0.88 < Index_{FINI} < 4.10$;
- informative involvement index $2.25 < Index_{INFI} < 5.87$;
- organisational involvement index $1.80 < Index_{ORGI} < 5.23$.

Thus, the stakeholders participated in social innovation processes having more informative and organisational involvement rather than financial involvement ($Index_{FINI} < Index_{ORGI} < Index_{INFI}$).

In the context of involvement of the stakeholders in social innovation processes in Latvia there is one leader – social innovators themselves. That means social innovators use or create their own sources of finance (see Figure 2), provide most informative base to other stakeholders (see Figure 3) and carry out the main organisational activities (see Figure 4).

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

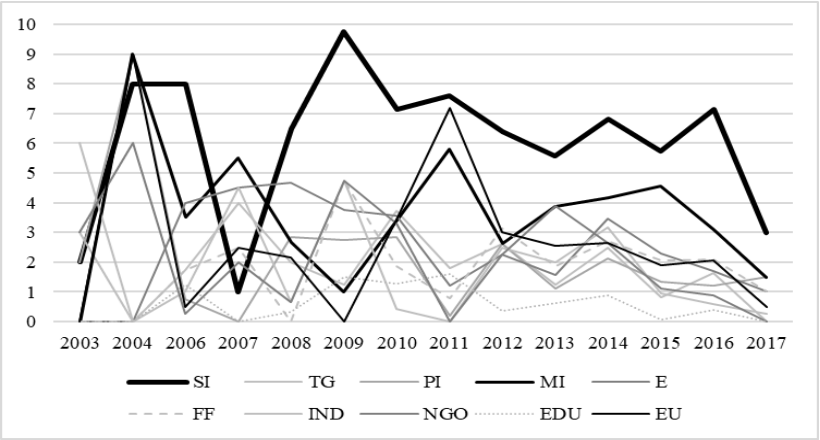


Figure 2. Dynamics of financial involvement of the stakeholders in social innovation processes

Source: the authors

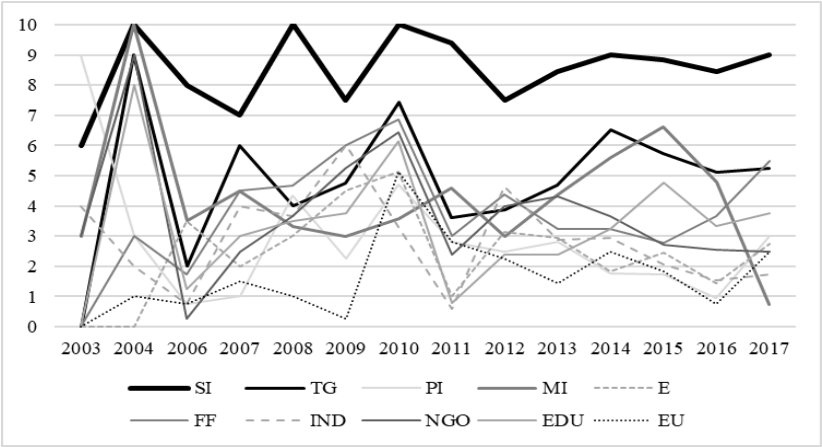


Figure 3. Dynamics of informative involvement of the stakeholders in social innovation processes

Source: the authors

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

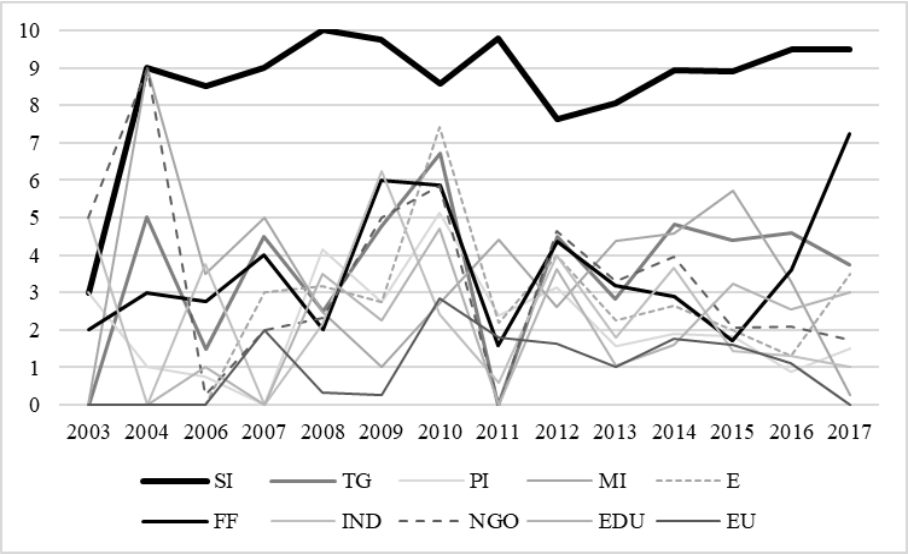


Figure 4. Dynamics of organisational involvement of the stakeholders in social innovation processes

Source: the authors

The more detailed analysis shows that the average indices of financial ($Index_{FINI}^{SI}$ = 6.04), informative ($Index_{INFI}^{SI}$ = 8.51) and organisational ($Index_{ORGI}^{SI}$ = 8.58) involvement of social innovators are significantly higher compared with the other stakeholders (see Table 4).

Table 4. The indices of involvement of the stakeholders in social innovation processes averaged over the period of 2003-2017

Rank	Financial involvement		Informative involvement		Organisational involvement	
	stakeholder	$Index_{FINI}$	stakeholder	$Index_{INFI}$	stakeholder	$Index_{ORGI}$
1	**SI**	6.04	**SI**	8.51	**SI**	8.58
2	**MI**	3.62	**TG**	4.85	**FF**	3.59
3	**EU**	2.67	**MI**	4.33	**TG**	3.56
4	E	2.42	FF	3.75	MI	3.50
5	NGO	2.20	NGO	3.73	NGO	3.37
6	PI	2.16	EDU	3.31	E	2.45
7	IND	1.92	PI	2.90	IND	2.39
8	TG	1.88	IND	2.86	PI	2.14
9	FF	1.75	E	2.41	EDU	1.89
10	EDU	0.59	EU	1.69	EU	1.02

Source: the authors

However, among the other stakeholders, municipalities demonstrate most openness and readiness to support social innovators financially ($Index_{FINI}^{MI}$ = 3.62); in some cases, financial support is rendered also by some

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

European Union organisations ($Index_{FINI}^{EU}$ = 2.67). The index of financial involvement of the other stakeholders is less than 2.5.

Besides the social innovators, also the target group ($Index_{INFI}^{TG}$ = 4.85) and municipalities ($Index_{INFI}^{MI}$ = 4.33) have informative involvement in social innovation processes which can be explained by their direct interest in the outcomes.

Organisational involvement is actively provided by social innovators who exploit their own skills and resources ($Index_{ORGI}^{SI}$ = 8.58) combining efforts with their families and friends ($Index_{ORGI}^{FF}$ = 3.59) and the target group ($Index_{ORGI}^{TG}$ = 3.56). However, an active role is played also by municipalities ($Index_{ORGI}^{MI}$ = 3.50).

Having determined the aggregated index of involvement of the society in social innovation processes in Latvia for each year separately (2003-2017) and the grand mean (3.20) over this period, it is concluded that the Latvian society is quite passive (see in Figure 5).

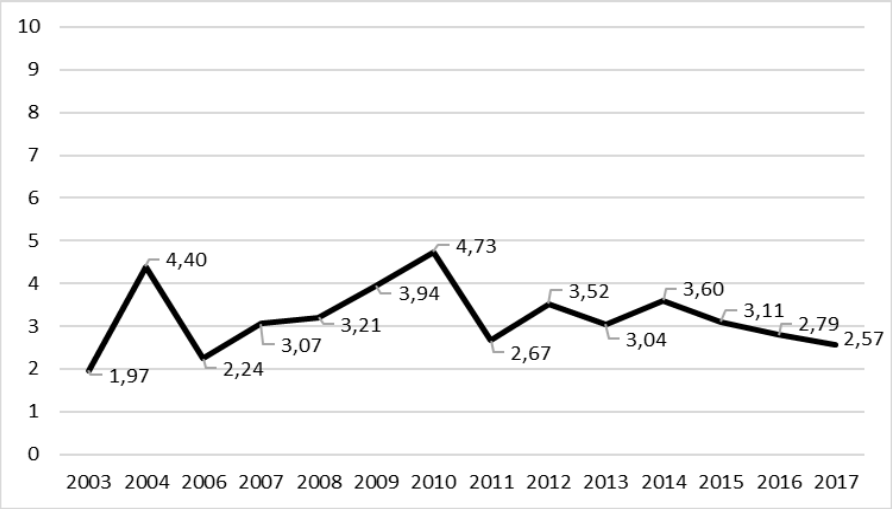


Figure 5. Aggregated index of involvement of the society in social innovation processes in Latvia

Source: the authors

Conclusions

Social innovation is realized by ten major groups of stakeholders: social innovators, their family and friends; other individuals who do not belong to family and friends of social innovators, target groups, public institutions or organisations, municipal institutions or organisations, enterprises, non-governmental organisations, educational institutions and supranational institutions or organisations of the European Union.

Stakeholders' financial, organisational and informative involvement in the realisation of social innovation can be evaluated based on the authors' elaborated indices – the means of the of social innovators' evaluations of the stakeholders' inputs in 10-point systems (see formulas 1-3).

The level of the society's financial, organisational, informative and overall involvement in social innovation processes in Latvia is not high which can be conditioned by the fact that social innovation is a relatively new concept in the Latvian society and there is not even a legal framework for that yet. Social innovators here try to solve their problems faced on their own account: 1) for organisational purposes attracting help of families and friends as well as of the target groups; 2) for getting information using the sources provided mainly by the target

groups, municipalities and families and friends; 3) for getting financial resources seeking for local municipalities' support and the European funds. The level of involvement of each stakeholder, excluding social innovators themselves, is rather low (see Table 4). Besides the social innovators, also municipal institutions and organisations in Latvia take an active part in the realisation of social innovation at informative, organisational and financial levels as they are directly interested in solving urgent problems and causing positive changes in the local community's life and environment.

References

Alegre, I.; & Berbegal-Mirabent, J. 2016. Social innovation success factors: hospitality and tourism social enterprises, *International Journal of Contemporary Hospitality Management, 28*(6): 1155-1176. https://doi.org/10.1108/IJCHM-05-2014-0231

Altuna, N.; Contri, A.M.; Dell'Era, C.; Frattini, F.; & Maccarrone, P. 2015. Managing social innovation in for-profit organisations: the case of Intesa Sanpaolo, *European Journal of Innovation Management, 18*(2): 258-280. https://doi.org/10.1108/EJIM-06-2014-0058

Benneworth, P.; & Cunha, J. 2015. Universities' contributions to social innovation: reflections in theory and practice, *European Journal of Innovation Management, 18*(4): 508-527. https://doi.org/10.1108/EJIM-10-2013-0099

Bonifacio, M. 2014. Social Innovation: a Novel Policy Stream or a Policy Compromise? An EU Perspective, *European Review, 22*(1): 145-169. https://doi.org/10.1017/S1062798713000707

Bund, E.; Gerhard, U.; Hoelscher, M.; & Mildenberger, G. 2015. A methodological framework for measuring social innovation, *Historical Social Research / Historische Sozialforschung, Special Issue: Methods of Innovation Research: Qualitative, Quantitative and Mixed Methods Approaches, 40*(3/153): 48-78.

Cajaiba-Santana, G. 2013. Social innovation: Moving the field forward. A conceptual framework, *Technological Forecasting and Social Change, 82*: 42-51. https://doi.org/10.1016/j.techfore.2013.05.008

CESifo Group Munich. 2016. *Design and Methodology of the Ifo Business Survey in the German Services Sector*. Retrieved from https://www.cesifo-group.de/ifoHome/facts/Survey-Results/Konjunkturtest/Dienstleistungen/Aufbau-und-Methodik-des-ifo-Konjunkturtest-Dienstleistungen-Deutschland--.html

Davies, A.; & Simon, J. 2013a. *The value and role of citizen engagement in social innovation*. A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research. Retrieved from https://youngfoundation.org/wp-content/uploads/2013/11/value-and-role-of-citizen-engagement.pdf

Davies, A.; & Simon, J. 2013b. *Engaging Citizens in Social Innovation: A short guide to the research for policy makers and practitioners.* A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research. Retrieved from https://youngfoundation.org/wp-content/uploads/2013/11/Engagign-citizens-in-social-inno.pdf

Davies, A.; & Simon, J. 2012. *Citizen engagement in social innovation – a case study report.* A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research. Retrieved from https://youngfoundation.org/wp-content/uploads/2013/11/citizen-engage-in-soc-inno.pdf

Davies, A. 2014. *Spreading Social Innovations: A Case Study Report*. A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research. Retrieved from https://educationinnovations.org/sites/default/files/Spreading%20Social%20Innovations%20%E2%80%93%20A%20Case%20Study%20Report.pdf

Dobele, L.; Grinberga-Zalite, G.; Kelle, L. 2015. Sustainable economic development: scenarios for promotion of social innovation in Latvia, *Journal of Security and Sustainability Issues*, *5*(2): 149–158. https://doi.org/10.9770/jssi.2015.5.2(2)

Dover, G. 2011. *Social Innovation and Institutional Work: A Study of the Role of Place and Place-Making in Social Innovations for the "Hard-to-House"*. Dissertation submitted in partial fulfillment of the requirements for the degree of doctor of philosophy in the Faculty of Business Administration.

European Commission. 2013. *Guide to social innovation*. Regional and Urban Policy. Retrieved from http://s3platform.jrc.ec.europa.eu/documents/20182/84453/Guide_to_Social_Innovation.pdf/88aac14c-bb15-4232-88f1-24b844900a66

European Union. 2012a. *Strengthening social innovation in Europe*. Journey to effective assessment and metrics. Retrieved from https://publications.europa.eu/en/publication-detail/-/publication/448c51d1-6933-46b0-9c39-5ffff10cb1c1

European Union. 2012b. *Financing social impact: Funding social innovation in Europe – mapping the way forward.* COM, Brussels. Retrieved from https://youngfoundation.org/wp-content/uploads/2012/10/Financing-Social-Impact.pdf

Hernandez, Y.; & Cormican, K. 2016. Towards the effective management of social innovation projects: Insights from project management, *Procedia Computer Science*, *100*: 237-243. https://doi.org/0.1016/j.procs.2016.09.148

Howaldt, J.; Butzin, A.; Domanski, D.; & Kaletka, C. 2014. *Theoretical Approaches to Social Innovation - A Critical Literature Review*. A deliverable of the project: 'Social Innovation: Driving Force of Social Change' (SI-DRIVE). Dortmund: Sozialforschungsstelle. Retrieved from http://www.si-drive.eu/wp-content/uploads/2014/11/D1_1-Critical-Literature-Review.pdf

Howaldt, J.; & Schwarz, M. 2010. *Social Innovation: Concepts, research fields and international trends.* IMO international monitoring. Retrieved from http://www.asprea.org/imagenes/IMO%20Trendstudie_Howaldt_englisch_Final%20ds.pdf

Institute for Supply Management. (2016). ISM Report On Business. Retrieved from https://www.instituteforsupplymanagement.org/pubs/content.cfm?ItemNumber=10706&SSO=1

Klievink, B.; & Janssen, M. 2014. Developing Multi-Layer Information Infrastructures: Advancing Social Innovation through Public–Private Governance, *Information Systems Management*, *31*(3): 240-249. https://doi.org/10.1080/10580530.2014.923268

Lee, E.K. 2017. Engaging citizens in society, *Social Innovation and Social Transition in East Asia*, *spring*: 16-18.

Lundstrom, A.; Zhou, Ch. 2011. Promoting innovation based on social sciences and technologies: the prospect of a social innovation park, *Innovation: The European Journal of Social Sciences*, *24*(1/2): 133-149. https://doi.org/10.1080/13511610.2011.583864

Mahmuda, I.; Baskaran, A; & Pancholi, J. 2014. Financing social innovation for poverty reduction: A case study of microfinancing and microenterprise development in Bangladesh, *Science, Technology & Society*, *19*(2): 249–273. https://doi.org/10.1177/0971721814529879

Minks, M. 2011. *Social Innovation: New Solutions to Social Problems.* A Thesis submitted to the Faculty of the School of Continuing Studies and of The Graduate School of Arts and Sciences in partial fulfillment of the requirements for the degree of Master of Arts in Liberal Studies.

Murray, R.; Caulier-Grice, J.; & Mulgan, G. 2010. *Ways to design, develop and grow social innovation: The open book of social innovation.* The Young Foundation & NESTA. Retrieved from http://youngfoundation.org/wp-content/uploads/2012/10/The-Open-Book-of-Social-Innovationg.pdf

OECD. 2010. *SMEs, Entrepreneurship and Innovation*. Series: OECD Studies on SMEs and Entrepreneurship. OECD Publishing.

Oganisjana, K.; Eremina Y.; Gvatua, S.; Kabwende, B.N.; & Chukwu, O.J. 2017. Barriers to Social Innovation and Ways of Overcoming Them in Latvia, *Journal on Systemics, Cybernetics and Informatics: JSCI*, *15*(5): 33-38. http://www.iiisci.org/journal/sci/issue.asp?is=ISS1705

Oganisjana, K.; Svirina, A.; Surikova, S.; Grīnberga-Zālīte, G.; & Kozlovskis, K. 2017. Engaging universities in social innovation research for understanding sustainability issues, *Entrepreneurship and sustainability issues*, *5*(1): 9-22. http://jssidoi.org/jesi/uploads/issues/Entrepreneurship_and_Sustainability_Issues_Vol5_No1_print.pdf

Oganisjana, K.; Surikova, S.; & Grīnberga-Zālīte, G. 2016. Sociālās inovācijas izpēte starpdisciplinārā skatījumā, *Latvijas Zinātņu Akadēmijas Vēstis*, *70*(3): 68.-76.lpp.

Oganisjana, K.; & Surikova, S. 2015. Social innovation in the promotion of sustainable development of the contemporary Latvian society, *Journal of Security and Sustainability Issues*, 5(2): 249–258. https://doi.org/10.9770/jssi.2015.5.2(10)

Oganisjana, K.; Surikova, S.; Laizāns, T. 2015. Factors influencing social innovation processes in Latvia, *Entrepreneurship and Sustainability Issues* 3(2): 186-197. https://doi.org/10.9770/jesi.2015.3.2(6)

Phills, J.A.; Deiglmeier, K.; & Miller, D.T. 2008. Rediscovering social innovation, *Stanford Social Innovation Review*, *6*(4): 33-43. http://ssir.org/images/articles/2008FA_feature_phills_deiglmeier_miller.pdf

Seyfang, G.; & Smith, A., 2007. Grassroots innovations for sustainable development: towards a new research and policy agenda, *Environmental Politics 16*(4): 584-603.

Russon Gilman, H. (2017). *The moment for participatory democracy*. Stanford Social Innovation Review. Retrieved from https://ssir.org/articles/entry/the_moment_for_participatory_democracy

Surikova, S.; Oganisjana, K.; & Grinberga-Zalite, G. 2015. The role of education in promoting social innovation processes in the society, in Lubkina, V. and Usca S. (Eds.), *Society. Integration. Education. Proceedings of the International Scientific Conference, May 22nd-23rd, 2015, Vol. IV,* Rēzekne: Rēzeknes Augstskola, 233–243. http://dx.doi.org/10.17770/sie2015vol4.337

The Young Foundation. 2012a. S*ocial Innovation Overview - Part I: Defining social innovation.* A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research. Retrieved from https://youngfoundation.org/wp-content/uploads/2012/12/TEPSIE.D1.1.Report.DefiningSocialInnovation.Part-1-defining-social-innovation.pdf

The Young Foundation. 2012b. *Social Innovation Overview - Part II: Practices and Trends.* A deliverable of the project: "The theoretical, empirical and policy foundations for building social innovation in Europe" (TEPSIE), European Commission – 7th Framework Programme, Brussels: European Commission, DG Research.

Acknowledgement

The research is conducted within the project 5.2.7. "Involvement of the society in social innovation for providing sustainable development of Latvia" as part of the National Research Program 5.2. "Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development – a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)".

The International Journal
ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES
ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2018 Volume 6 Number 1 (September)
http://doi.org/10.9770/jesi.2018.6.1(28)

Short biographical note about the contributors at the end of the article (name, surname, academic title and scientific degree, duties, research interests):

Karine OGANISJANA, Dr. paed. is an associated professor and leading researcher at the Faculty of Engineering Economics and Management of Riga Technical University. Her fields of expertise are research methods, qualitative research, pedagogy and interdisciplinary teaching and learning for developing students' creativity, entrepreneurial skills, critical, logical, analytical and systems thinking. Karine Oganisjana has been the head of a European Social Fund project and National Research Programme project. She is a member of ASEM, Asia-Europe Lifelong Learning Research HUB Network 5 "Core competences". She is an author of 40 scientific papers and 10 books and monographs.
ORCID ID: orcid.org/0000-0002-4835-3943

Svetlana SURIKOVA, Dr.paed. is a leading researcher in the Scientific Institute of Pedagogy at the Faculty of Education, Psychology and Art of the University of Latvia. Her scientific interests are related to the research of professionalization of adult educators, effectiveness and quality assurance in adult and continuing education as well as interaction between social innovation and education, challenges faced to the promotion of social innovation from the perspective of education.
ORCID ID: orcid.org/0000-0002-3025-6344

Konstantins KOZLOVSKIS, Dr.oec. is an associated professor at the Faculty of Engineering Economics and Management of Riga Technical University. His fields of expertice are econometric modeling, investment management, financial markets, financial instruments, quantitative trading strategy development, implementation of mathematics, statistics, and information technologies in real conditions used for different purposes by academic and business entities. He is an author of more than 30 scientific papers and 12 books.
ORCID ID: orcid.org/0000-0003-3384-4499

Anna SVIRINA graduated from Kazan State Technical University in 2001, and got doctoral degree in economics in 2011 in management and economics of enterprises. Prior to start academic career, she worked as an accountant and entrepreneur. Her research interests are entrepreneurship, social business, managerial efficiency. Anna is currently working on development of quality management research center at Kazan National Research Technical University.
ORCID ID: orcid.org/0000-0001-8598-558X

Register for an ORCID ID:
https://orcid.org/register