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REAL OPTIONS ANALYSIS OF ABATEMENT INVESTMENTS FOR SULPHUR EMISSION CONTROL AREAS COMPLIANCE*

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Abstract. Since the introduction of the Sulphur Emission Control Areas (SECA) regulations in the Baltic Sea Region (BSR) in 2015, the BSR has witnessed high compliance rate. However, a closer look to the situation reveals that the currently preferred compliance strategies depend on low oil price where ship owners shun investments in abatement technologies which may lead into an economic trap in the event of the oil price increase. The research considers incentive provisions for maritime investors who make investment decisions related to clean shipping and maritime fuel management. Traditionally, the financial assessments of these decisions are based on capital budgeting methods comprising cash flow analyses and net present value calculations. The findings reveal that the Real-Option approach represents a more realistic, reliable and promising method for the evaluation of abatement projects, especially under uncertainty and high volatility in material resource markets. The results can be applied to the evaluation of all projects in the maritime industry that depends on the price variation of the underlying asset during a specific period.

Keywords: SECA regulations; maritime investments; Real-Options; Monte Carlo simulation; clean shipping

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1. Introduction

Green and environmentally friendly shipping have received much attention based on concerns for its local and global contribution to air pollution and environmental problems. Therefore, the Sulphur Emission Control Areas (SECA) was implemented targeting reduction of sulphur emissions from shipping (Olaniyi, 2017). International Maritime Organization (IMO) decided that all ships in SECA have to use marine fuels with a lower amount than 0.1% of Sulphur content from January 2015 (IMO, 2015, 2016) to ensure a greener and more sustainable maritime transportation system.

There are three primary SECA regulations compliance options for the ship owners. First, as Turesson and Weddmark (2015) stated, is to switch the use of the marine heavy fuel oil (HFO) to the cleaner low-sulphur fuel such as the Marine Gas Oil (MGO) and Marine Diesel Oil (MDO). The second alternative is to continue with the high-sulphur fuel (i.e. HFO) and installing an exhaust gas treatment system, an abatement technology called the scrubber which gives room for the continuous use of the HFO (Farrell et al., 2002). The third option is to switch to other alternative sources of fuel such as Liquefied Natural Gas (LNG), methanol or hydrogen cells. These alternative fuels are being considered for future solutions to meet the SECA requirements (Turesson & Weddmark, 2015). Olaniyi, Atari and Prause (2018) result also revealed that most of the ships are switching to the use of the low sulphur fuel because it removes the hassles of capital compliance investments. Moreover, Hämäläinen (2016) found out that, in Finland, 45 % of shipping operating costs are fuel costs. This finding makes fuel one of the most critical factor in shipping industry so that the optimisation of fuel consumption as well as the choice of the best alternative for abatement are not only important for environmental reasons but are also crucial for the maritime industry due to economic conditional.

The Global Marine Fuel Trends 2030 study (DNV GL, 2018), affirms that combining the use HFO with an abatement technology is likely the most cost-effective option for the ships for SECA compliance because the MGO is more expensive than the HFO. Furthermore, the limitations associated with the use of the LNG such as insufficient bunkering facilities and the expensive conversion costs for old vessels is also a hindrance (Bergqvist et al., 2015). With this background, the scrubber technology, in the light of different uncertain factors of other low sulphur fuels received much attention over the last years and the number of scrubbers installed on board ships increased slightly (Eelco & Maarten, 2015).

The scrubber technology was initially developed to prevent the pollution problem from the power plants with the first marine scrubber developed in Finland and started operation since 2012 (Matczak, 2013). Through installations on new ships and retrofitting meanwhile, 87 scrubbers were installed by the end of the year 2016 in the BSR (HIS, 2017). Scrubbers are classified as open loop and closed loop, and some of those are built based on hybrid technology (i.e. a combination of the both the open and the close scrubber technology installed on one ship). The open loops are cheaper with lesser operating costs than closed loops. Scrubber installations have sparked a discussion on the ecological implications and specific problems the abatement technology so that Germany and Belgium are not allowing ships to enter their ports, which are operating with an open loop scrubber (Lindstad et al., 2015).

It is no gainsaying that clean shipping initiative demands best business solutions for the maritime industry since the economic impact of the SECA regulations is as significant as the environmental impacts for clean shipping infrastructure investments and development of sustainable business models for public and private maritime enterprises. Making investment decisions require advanced analytical methods because the known traditional methods have many shortages and are not particularly precise when they measure static conditions without forecasting and estimating or taking many parameters in future into consideration (Dixit and Pindyck, 1994). Right decision-making process regarding investments or financing project is essential to creating positive projects economic conditions and this applies to projects with high risks in front lines of technology (Cox et al., 1979).

Accordingly, the SECA regulation and compliance can promote the enhancement of high technology and in response to new needs; the analysis of the actual disposal of the new rationale concerning investment and valuation decisions is needed. Thus, the objective of this work is to provide empirical validation of methods that can solve investors' challenge of SECA compliance investment decisions to avoid loss and maximise profit. Through a case study, the work focuses on the analysis of the historical time series data of fuel prices, scrubber inward investment, operating cost of scrubber-retrofitted ships, as well as on the analysis of the NPV and Real-Option investments calculations. All activities took place in the frame of "EnviSuM—Environmental Impact of Low Emission Shipping: Measurements and Modelling Strategies" project sponsored by the EU regional development fund.

This paper intends to assess the economic performance of this innovation project of the shipping companies. Methods for economic analysis are currently the most diffused methods for evaluation of innovation projects (Ryan and Ryan, 2002). Although the existing methods largely differ in their implementation, they all share a common principle, that is, the capital budgeting approach for calculating the economic return of a project as a sequence of discounted cash flows (Chiesa and Frattini, 2009). Besides the standalone practices for analysis of investments and assessment of innovative projects, these traditional techniques are extended in this work through the use of the real-options approaches and dynamic analyses into project evaluation, which considers the value of embedded options and the flexibility of the dynamic process of decision-making (Brealey et al., 2012). The authors also suggest the use of analytical and numerical methods like the Black-Scholes model, binomial model and Monte Carlo simulations to quantify risks and uncertainties associated with the feasibility of investments in scrubber technologies.

The remainder of the paper is arranged in the following manner: In the next section, the authors describe the theoretical framework that forms the bases for this study. The third section presents the empirical methodology described briefly above, with an emphasis on the identification of exogenous parameters related to the study case, the capital budgeting approaches and the real option valuation methods. The fourth section illustrates the case study, layout our estimations and discusses the main results and findings. The last section concludes the article.

2. Theoretical background

2.1. Investment and capital budgeting in scrubber technology

Evaluating corporate investments' value or assessing innovative projects' performance allows managers to effectively improve their business decisions and investment planning, in order to guide the project management, optimize the project efficiency and maximize the project economic return. Finance theory states that expected (future) cash flows (CF), either the positive or negative income streams an investor would receive from an investment should be discounted at the opportunity cost of capital and adjusted for the time value of money, so as to estimate the net present value of the investment. Thus, the project valuation and the investment decision are made thoroughly.

It is widely recognized that the process facilitating the decision-making is called the Discounted Cash Flow (DCF) method. This method (DCF) is viewed as a plausible and robust approach to quantify the complex and large-scale investment in single parameters (e.g. the net present value—NPV generated by investments to summarise performance indexes that illustrate the attractiveness of the investment (e.g. the internal rate of return—IRR and the profitability index) (Ye and Tiong, 2000; Downes and Goodman, 1998). The reliability of this method is motivated by the fact that its parameters are easily observed and calculated, takes into account the time-dependent value of money and involves predicting cash inflows and outflows related to the investment over its lifespan (Savvides, 1994; among others). In addition, although the existing methods largely differ in their implementation, they all share a common principle, that is, the capital budgeting approach for calculating the economic return of a project as a

sequence of discounted cash flows (Di Lorenzo et al., 2012, Copeland et al., 2010; Chiesa and Frattini, 2009; among others).

On the other hand, the Net Present Value (NPV) is the most commonly used economic approach to evaluate different types of investments (Ross, 1995). It consists of discounting all future cash flows (both in- and out-flow) resulting from the innovation project with a given discount rate and then summing them together as reported in equation 1. The most straightforward rule of the NPV decision is to discard all projects with negative NPVs and undertake all projects with positive NPVs. This type of decision rule ensures that companies maximise value for their investments. Therefore, the merit of innovation is measured considering its contribution to the creation of economic value out of the investment initial cost, i.e. when the NPV is greater than zero. Thus, when applying the NPV approach to the scrubber investments in the shipping industry, the NPV of a scrubber is expressed with the following specification:

$$NPV_t = \sum_{t=1}^T \frac{CF_t}{(1+r)^t} - CapEx_0 \quad (1)$$

In this given formula, CF_t is the expected cash flow generated in year t , representing the savings from operating income at the end of year t , which assumed to be constant over the whole investment period. T is the investment period (i.e. the economic life of a scrubber); r is the risk-free interest rate - usually in financial evaluation, cash flows are discounted at the weighted-average cost of capital (WACC). The term $(1+r)$ is in the finance literature called the discount factor and $CapEx_0$ is the capital expenditure, which corresponds to the initial capital investment in a SOx scrubber. The sum of the discounted values of the cash flows corresponds to the present value (PV) of the inflows sequence.

This approach is risk-adjusted, while other metrics of capital budgeting and performance criteria such as ROI, IRR (Internal Rate of Return) or MIRR (Modified Internal Rate of Return) are not (e.g. Maquieira et al., 2012; Jackson and Sawyers, 2008; Kierulff, 2008). In its basic application the discount rate is calculated looking at the “real” cost of capital employed in the project, that is, by calculating the weighted average cost of equity and debt used to finance the project. This was discussed from theoretical and empirical standpoints in Lifland (2015), Chiesa and Frattini (2009), Myers, et al. (1976), Myers (1972).

However, when flexibility is the core project objective, the standard DCF based method and the NPV indicator underestimate the current value of the investment i.e. the present-worth asset-value, as well as some management options such as sensitivity and scenario approaches and real-option analysis (e.g. Di Lorenzo et al., 2012; Farragher et al. 2001; Copeland, 2001; Ho and Pike, 1998). For instance, Milne and Whalley (1999) discussed that in the event of delayed investment, the future income and option values have to be added to the current year NPV, so to take into consideration compensation of the time-value of money, the asset value should be higher than the commencing investment in the options. This description mainly makes the NPV and standard-DCF method inappropriate and insufficient for evaluating shipping industry investments.

The recognized inappropriateness of the DCF method has necessitated the undertaking of different approaches such as the real-option pricing approach and scenario techniques, which introduced sensitivity analysis, uncertainty associated to the option value and dynamic analysis to the project valuation (Di Lorenzo et al., 2012). Similarly, McLeish (2005), Copeland (2001) and Dixit and Pindyck (1994) have in the past proposed better models based on the NPV indicator, the uncertainties associated with future discounted cash-flows and the probability of the different possible scenarios in different market conditions to evaluate investment appraisal.

Di Lorenzo et al. (2012) and Dixit and Pindyck (1995) propose that the DCF could be used together with Real-Option integration to assess investments plan in a common project or in a high-tech industry where the company want to commercialise new products.

2.2. Real-Option investment evaluation of the scrubber technology

Options trading is a major part of investments in the capital market and its use in the evaluation of investment appraisals is popular. It is important to emphasize that the real option valuation method of investment projects is the extension of financial options theory on real property. Black and Schools (1973) introduced options trading approach into investment appraisal by using the option pricing to evaluate an investment from the zero points of the project. By incorporating a constant price variation of the asset, the money value of the time, the option's exercise price and the option's expiration value, the Black and Schools model calculates the price of a call option and put option in general. Boyle (1977) introduced a new option valuation approach called Monte Carlo Simulation (MCS) where the options traders generate random variables to get the pricing value. With this approach, a simplified simulation is to generate an optional quantity of random variables. However, it has been less acceptable than other approaches for the evaluation of an option price (Glasserman, 2013).

Maritime investors, especially in the shipping industry, appreciate investment decisions, which allow reaction and adaption on price movements for energy commodities since there is no reliable method to predict future prices trend. Thus, the authors propose that it might be of a higher value to obtain a scrubber or install engines that allow them to switch between energy sources to be able to use the most economical fuel. Acciaro (2014a) suggested such an abatement technology installation model for maritime industry and used the model to determine the optimal time for deferrals of investments and to evaluate investments at the present or in the future. Acciaro investment model was empirically tested and validated with an abatement project on a handy size vessel which was LNG retrofitted. Cox et al. (1979) offered the first simplified future pricing and option valuation model popular among options traders. According to Brach, (2003), the application of Cox's model delivers an expected asset value, the best and worst-case fuel prices scenario as well as the risk-free rate where the investment cost is the same as the exercise price. In the case of a new abatement technology such as the scrubber, investment as an option forces managers to make a decision based on their profit in the first two or three years. However, if the company want to know what could happen within the market in a longer period, then the binomial option-pricing approach would be helpful to illustrate or make investments strategic map where it shows the upper and the lower bands values in the best and worst investment scenarios. Because of this, it has been a more favourable approach among investors. The different fuel scenarios with the highest (V_{Max}) and lowest (V_{Min}) value of saved capital will be calculated to draw the strategic investment binomial lattice (tree) of scrubber technology investment. To acquire the expected asset value of the periodic cash flow C so savings from a constant HFO fuel price over time will be calculated as:

$$C = \text{Max} \left(0; \frac{P \cdot V_{Max} + (1 - P) \cdot V_{Min}}{(1 + r)^t} - K \cdot (1 - r)^t \right) \quad (2)$$

where, K is scrubber costs; r is risk-free rate or WACC (weighted average cost of capital), proxied by the LIBOR rate; T is time at which the option can be exercised; V_{Max} is lattice's up-factor that reflects the maximum value of the saved capital and V_{Min} is lattice's down-factor that reflects the minimum value of the saved capital. In the binomial tree approach (Cox-Ross-Rubinstein) these two factors generate the project's random (present value) of cash flows (CF) so that the original cash flow volatility is preserved. Hence, the next period project cash flow values will move in two directions to conform to the lattice's up and down multiplicative factors and expressed as follows:

$$V_{Max} = e^{\sigma\sqrt{\Delta t}} \quad V_{Min} = 1/V_{Max} = e^{-\sigma\sqrt{\Delta t}} \quad (3)$$

where, σ is the volatility of the underlying assets' value, i.e. the present value of cash flows and Δt is one time period.

With this approach, it should be noted that the option value is calculated by applying the risk-neutral probability P of the investment result. The risk-neutral probabilities allow discounting the cash flow and asset over the period at the internal rate of company risk-free added to the cost of the capital. In other words, instead of using the simple decision tree to calculate the option values, a risk-neutral probability decision tree has to be used discounting asset values at the risk-free rate r . The weighted probability P using the actual outcome of the sum of probabilities on upward and downward option values will be:

$$P = \frac{(1 + r) - V_{Min}}{V_{Max} - V_{Min}} \quad (4)$$

Where P is the risk-neutral probability.

Acciaro (2014b) option evaluation model was based on a discrete binomial tree approach and he argued that using Black and Scholes's method as an option-pricing approach is not appropriate for real asset option-pricing in maritime sector due to several reasons, one of which is the difficulty of proving the historical normal distribution of the underlying data.

2.3. Real-Options and deferral investments

A real project is a tangible asset with the same value as a corporate investment opportunity. It means that the integration between DCF and the Real-Option is similar to a call option where the investor has the right but not the obligation to invest in an underlying asset at a specified fixed price during an agreed period of time or at a given date (Cherry, 2007; Hull, 2006; Luehrman, 1998; Natenberg, 1994). As a common managerial option, its use in practice is through an option to defer, i.e. to wait until further information reduces market uncertainty, and an option to abandon, i.e. to dispose of any unprofitable project or investment (Fusaro, 1998; Trigeorgis, 1996).

Fundamentally, the price of an option in both financial and real project reflects the expected future payoff of the underlying asset at the time of exercise where the expected future payoff is discounted back to the present at the risk-free rate revealing the present option value (Fusaro, 1998; Luehrman, 1998). There is an essential acquisition time for the call options, exercising (strike) options time, twin security arbitrage options of selling and buying or lending and borrowing the capital for the investment (Fusaro, 1998; Trigeorgis, 1996). Arbitrage occurs when a security is purchased in a single market concurrently and using the twin security strategy and investment decision at the time of investment is like a mixture of lending and borrowing. Capital investors can thus build a continued duplicating portfolio to hedge the options this way (Poon and Granger, 2003). However, in diverse financial market options, the strike prices (i.e. the price at which the holder of options can buy) are fixed, while in Real-Options acquisition are not constant. The value of the Real-Option also depends on how uncertain costs and future cash flows correlate to each other (Trigeorgis, 1996).

Furthermore, in Real-Options pricing, it is assumed that the twin investment security option exists which would allow the investors to choose between the real projects or invest in two or more securities at the same time. This situation allows the risks and payoff of the projects to better conform to the market, the options and stock risks or gives room to construct a risk-free hedge in a very optimal situation. In financial market options, the strike prices are fixed, while in Real-Option acquisition, the strike time is set for the future (Poon and Granger, 2003). The value of the Real-Option will depend on how uncertain the costs and future cash flows correlate with each other.

Therefore, investors in an uncertain situation can predict the costs of the options accusation that will eventually take place (Bareley et al., 2012). In fact, the situation for Real-Options is different in financials market where the value of the asset is observable at any time of exercise, expiration and sales are well defined (Ho and Liao, 2011).

Notably, the options are essential for the sizeable capital-intensive project because of the proven efficiency in diverse industries to evaluate nuclear plants, airlines, and railroads (Fernandes et al., 2011). They are also crucial for projects involving new products where the acceptance in the market is uncertain and is equivalent to a firm having a portfolio of call and put options (a call option is like restarting an operation when a project is currently shut down while a put option is like shutting down a current project operation) (Bengtsson, 2001). The option to choose when to start a project is an initiation or deferment option. Initiation options are particularly valuable in natural resource dependent companies where a firm can delay purchasing a commodity like a scrubber or change the fuel type it uses until the market conditions are favourable. This is what it means to wait before taking any action until more is known or when the timing is expected to be more favourable (Dixit, 1992). In a typical market, this approach entails understanding when to introduce a new product or replace an existing piece of equipment to increase or decrease the scale of operation in response to demand, which is comparable with the option to expand or abandon which are crucial for after-investment progress (Trigeorgis, 1993).

The key action for the uncertain situation is to be able to delay investment without losing the available opportunity done by creating a call option on the future investment (Myers and Majluf, 1984). The riskiness of cash flow generated by the project can change significantly during the project lifespan and in the case of projects with production facilities. It may not be optimal to operate a plant for a given period if revenues do not cover the variable costs (Grimsey & Lewis, 2002). In this view, if the price of fuel or any other correlated alternative fuel type falls below the cost of initially calculated, it may be optimal to temporarily shut down the engine type and switch to another type of fuel source until the oil price recovers. An electric utility may also have the option to switch between various fuel sources to produce electricity on the ship.

Against this backdrop, this work will be considering a pricing model of options that depend on the approach of Black–Scholes model and the Binomial option-pricing model (i.e. Hull, 2006; Black and Scholes, 1973; Cox and Rubinstein, 2001). The option prices are determined by the simple discounting method with the expectation that the values of each option at the expiration date will be traded using unreasonable risks premiums as discount factors that were to reflect the volatility of the option according to Jensen (1972). However, the Black-Scholes pricing methods of financial asset assume a lognormal distribution of future returns in a continued period of work from Black and Scholes (1973) where they called the practice a diffusion process or a continued and unhindered arrival of information that causes price change with either a constant or changing variance. These price changes are normally distributed or logged to resolve market uncertainties so that investors can make better and informed decision regarding whether to invest or defer (Arriojas & Mohammed, 2007).

In shipping, operators may have a different approach to the investment on prices and project available to provide better insights into market conditions. Aforementioned, they may decide for example to exchange input resources, that is, switch from one energy form to another or from one type of engine and fuel to another. The commodities between the two include the following generic basics: investment ambiguity, irreversibility, the ability to choose between two or more alternatives (Black and Scholes, 1973).

Following the general option-pricing model of Black and Scholes (1973) and upward and downward probability (this will replace later by a real value to the main formula), investment opportunity in a scrubber technology can be modelled as a call option on the net present value of the expected future revenues from the operating scrubber gas treatment system. This offers the option to invest or postpone regarding the circumstances that affect the formation of the net present value of this project. Therefore, the price of the call option is estimated by solving the following nonlinear equation:

$$\text{Option Call Price} = S_0 N(d_1) - Ke^{-rT} N(d_2) \quad (5)$$

Where $N(d_1)$ and $N(d_2)$ denominate the standard normal cumulative distribution function and e is Euler's constant. The formulas for d_1 and d_2 are given as follows:

$$d_1 = \frac{\ln\left(\frac{S_0}{K_t}\right) + \left(r + \frac{\sigma^2}{2}\right) \times T}{\sigma\sqrt{T}} \quad d_2 = d_1 - \sigma\sqrt{T} \quad (6)$$

Where C is the value of a call option. S_0 is the present value of future cash flows from the investing in the scrubber (i.e. the expected revenues from the operational risky investment in scrubber). T is option's time to maturity or expiration (i.e. the length of time option is viable). $N(x)$ is the cumulative distribution for the standard normal distribution. σ the riskiness of the scrubber, the volatility of the worst- and best-case scenario of the investment (i.e. the standard deviation of the expected rate of return on S). K is the option's exercise price at the end of the period (i.e. the cost of converting the investment opportunity into the option's underlying operational project) and d_1 , d_2 are deviations from the expected value of the normal distribution.

Thus, the proposed pricing in the maritime industry for obtaining new technologies specifically scrubber technology will be calculated as:

$$\text{Option Call Price} = S_0 \times N(\text{pward probability}) - \text{scrubber cost} \times e^{-rT} \times N(\text{downward probability}) \quad (7)$$

In reality, the daily fuel consumption of any ships is a critical factor in calculating the daily and annual cost of fuel consumption, so the time spent within or outside SECA and the time of sail are considered for computation. With these numbers, it would be easy to calculate the value of the cost of fuel consumption easily. If the ship owners decide to operate their ships with fuel change, then, the price spread can be considered for calculations to determine the additional costs of operation and how much savings can be achieved by not changing fuel. The savings are the future cash flow parameters in option value and the cash flows for each period in the traditional methods.

2.4. Real-Options and dynamic analysis: Monte Carlo simulation

The paper empirically examines the joint stance of the DCF and Monte Carlo Simulation (MCS) analyses so to approximate the true NPV of the scrubber investment by incorporating a set of dynamic variables that directly affect the anticipated cash inflow-outflow valuations. The MCS introduces dynamic (probabilistic) analysis into project evaluation by using random inputs in order to model uncertainty and as such, it makes the DCF method more precise for investment appraisal and reliable decision tool in the project risk management (e.g. Di Lorenzo et al., 2012; McLeish, 2005; Ryan and Ryan, 2002). Based on multiple statistical simulations (modelling various scenarios), the MCS technique is likely to be realistic and reflects the dynamic nature of the investment lifespan (e.g. see Ara and Lee (2017)).

More formally, the MCS primarily allows producing an estimate of the project's NPV conditional on the set of random variables drawn from their underlying distribution and to assess the risk associated with the project (i.e. the Value-at-Risk related to the investment). Specifically, in this study, the MCS technique consists on generating stochastic variables by using a random uniformly distributed variable (in the $[0,1]$ interval) to create a scenario analysis utilizing hundreds of possible iterations that continually change the NPV of the asset valuation (e.g. McLeish, 2005; Ryan and Ryan, 2002). The Black and Scholes (1973) model flowed back and the expectation

function of the underlying asset defined (project's value) as a function of a geometric Brownian motion with a drift. Hence, the project's value was pre-specified and assumed to follow a stochastic process as follows:

$$dS_t = \mu S_t dt - \sigma S_t dW_t \quad (8)$$

where S_t is the value of the financial in each time period t , σ its estimated volatility, μ is the drift (yield) measuring the average growth per unit of time, W_t is normally distributed random variable with mean 0 and standard deviation \sqrt{dt} and W is a Brownian motion. Assuming that σ , μ and W_t are constants.

3. Methodology

The study was empirically validated through data from expert interviews, focus group meetings and other case studies done in the frame of EnviSuM–Environmental Impact of Low Emission Shipping project. The case project began in early 2017 until the end of the same year using investments in a scrubber with an installed capacity of 15 KW for the engine power of 48K KW sailing in BSR, mainly between the ports of Helsinki and Tallinn. The daily fuel consumption of the considered ship is assumed to be about 60 mt/day for 350 operating days/year.

The study reviews the compliance investment of a scrubber retrofit with a continuance use of IFO380 or an engine upgrade that involves the boiler and other necessary equipment for LSMGO or ULSFO with 0.1% Sulphur content. A case study was constructed to project real-life scenario to evaluate the scrubber project investment feasibility. The empirical data was used to determine the costs build-ups of the scrubber technology using the conventional investment evaluation tools, i.e. NPV, IRR, MIRR and the payback period comparable to using the proposed real options model. Afterwards, the result of the comparative analysis was used to determine which of the investment evaluation tool is most promising for SECA compliance investment decisions to avoid loss and maximise profit.

3.1. Case Study: application of Real-Option methodology to a maritime investment project

Investment evaluation with the Real-Option approach is not widespread in the maritime industry, and existing literature mostly used the real-option investment evaluation in mining, power plants and new sustainable energy resources with only a couple of research in the maritime industry working on LNG evaluation. With this investment evaluation approach, the authors made a qualitative analysis of the case in the shipping industry. The presented case study addresses an investment project of scrubber abatement and its evaluation. For this study, two evaluation methodologies were compared: the traditional NPV and the ROA (using Black and Scholes model, Monte Carlo method and Binomial option-pricing).

3.2. Project characteristics and descriptive

The cost of a new standard open loop 15 MW scrubber system for the mentioned ferry RoPax type sailing within SECA in the BSR with two main engines is roughly 5.5 million €. The price of a scrubber installation is calculated based on the ship engine power and the number of main engines. Results from the experts' interview indicated that an upfront investment for a ship with two powerful engines required a scrubber cost of €5.8 million. Usually, the flat rate of the scrubber initial cost start from over €2 million depends on the ship design and the choice between the dry or wet (open/close/hybrid loop) scrubber system. The design of the scrubber is usually tailor-made and is unique for every ship.

Half of the total costs are estimated as the actual cost while the other half is designated for installation. At the time of scrubber installation, the ship will be out of service for more than thirty days, involving fundamental construction

changes, commissioning, testing and training. The estimated cost of maintenance is approximately 20 000€/yr. The scrubber system was created using Caustic Soda (NaOH) solution, which is easily within reach globally.

The quickest approach to procure the scrubber chemicals is to order the needed amount of tank cars to the port that the vessel will visit. The cost of materials depends on where the chemical is purchased, and the delivery time, however, the usual price for NaOH was around 300 €/t in 2017. If the ship scrubber system running is a closed loop mode, the costs of operation include a bleed-off treatment unit (BOTU) for the water treatment. This unit usually consumes additional chemicals to complete the cleaning circle adding an operating cost that includes flocculent or coagulant additives. Sometimes to calculate the extra expenses and operating cost, a 2% maintenance and extra operation cost is added to the annual operating costs.

The scrubber has a lifespan of 15 years and the economic lifetime of the ship is 25 years (Atari and Prause, 2017). Some parts of the scrubber may have a shorter lifetime, which would require replacing with spare parts before the machine span life is over. For investment appraisal, it is crucial to predicting the risk-free rate as well as the cost of capital. Mkouar and Prigent (2014) explained that the primarily driven factor in erratic investment is the interest rate, which influences both the cost of capital and discount rate. Some part of the investments funding is from the company's equity while the remaining funding through bank loans, manufacturer companies or export credit financiers. The subject case is using a bank credit of over 15 years set to be repayable through annual payments from the beginning of the scrubber operations and whose annual payments are subject to an interest rate and an opportunity cost on the capital.

4. Results and analyses

Among the advanced low-gas emission regulations in the shipping industry in the BSR, switching to low-sulphur fuel by installing scrubbers and/or using LNG is gaining widespread acceptance as promising options. Thus, its economic performance should be compared with that of identical without using the scrubber and low-sulphur fuel (i.e. ship using HGO 3.5%S).

The subsequent subsections will present and discuss different calculations methods and the main results for the appraisal of low-sulphur scrubber investment proposals. Importantly, such economic analyses are based only on the baseline results of the first-year cost-benefit evaluation of the project.

4.1. Investments evaluation using conventional methods for evaluation

Undertaking the switch to low-sulphur emission and investment in scrubber technology requires that the shipowner conducts cost-effectiveness and evaluation analyses, and as such evaluate the worthwhileness of installing an exhaust gas cleaning technology.

The conventional methods to evaluate the project viability in this case of study are a set of criteria: the NPV, the IRR, the MIRR, the payback period and the profitability index. These methods are optimistic assumptions because it is improbable that bunker fuel prices would remain constant over a span of 15 years. Hence, in the real world, fuel prices might be characterized by a significant variance over the time, and so the realized future cash flows are not constant over the operational period. Thus, the basic assumptions were slightly modified, to provide NPV and real options valuations with a realistic quantitative outcome. Thus the authors applied a dynamic approach by introducing a random variable to predict future fuel prices.

In this case, the pricing is based on the assumption that the movement of fuel prices follows some sort of random walk and all effective costs and benefits due to the scrubber technology solution adjustment for the annual inflation rate. The success and accuracy of DCF analysis are determined by the choice of concomitant discount rate. A

discount rate of 11% is assumed, which is defined by disregarding the composition of funding sources. This assumption could strongly influence the project results. Therefore, bearing in mind these assumptions, the results of the project evaluation are reported in Table 1.

Table 1. Key input-variables, DCF primary results and criteria for evaluation

Data	Value	Definition/Sources	Measure
Panel A: Inputs and cost-benefit analysis			
CapEx	€5 684 000.00	Annual capital expenditures equal approximatively to the initial price of a scrubber.	
OpEx	€4 238 945.31	Annual operating expenditures of the first operational year.	
Spread-saving	€4 768 908.00	Annual spread savings equal to the daily spread prices between HFO and MGO prices of the first operational year.	
Saving-OpEx	€3 251 344.67	Estimated annual cash flows of the first operational year.	
NPV _{1y}	€-2 432 655.33	The net present value (NPV) of the first operating year, a forward-looking measure of the project profitability, equals the difference between saving-OpEx and CapEx. By default, keeping the NPV without 1y-index.	Equation (1)
Discount rate	11.00%	The Weighted Average Cost of Capital (WACC) is the company's weighted cost of capital that, that includes all capital sources: equity and debts. It proxies the discount rate of the estimated cash flows (i.e. Block, 2011; Bennouna et al., 2010).	Proxy by Treasury bonds with a maturity of 10 years in the EU zone.
Panel B: Conventional investment evaluation indicators			
NPV _{15y}	€22 767 025.57	The net present value (NPV) is the difference between the present value of the cash flows (the benefit) over the project lifespan (15 years) and the cost of the investment (i.e. Maquieira et al., 2012; Viviers and Cohen, 2011; Bennouna et al., 2010).	Equation (1)
Payback Period	1.69	The payback period (PP) is the expected number of years required to recover the original investment (i.e. Hermes et al., 2007; Ross et al., 2004).	$PBP = \frac{I_0}{Cumulative\ CF}$
IRR	56.92%	The internal rate of return (IRR) is the discount rate that equates the present value of cash flows over the whole 15 years and the initial cost of the investment (i.e. Maquieira et al., 2012; Jackson and Sawyers, 2008).	$\sum_{t=1}^T \frac{CF_t}{(1 + IRR)^t} = 0$
MIRR	20.92%	The Modified Internal Rate of Returns (MIRR) is the average annual rate of return that will be earned on investment if the cash flows are reinvested at the WACC (i.e. Kierulff, 2008; Jackson and Sawyers, 2008).	$= \frac{I_0}{(1 + MIRR)^T} \sum_{t=1}^T DCF \times (1 + r)^{t-1}$
Profitability Index	5.01	Profitability Index (PI) metrics the relative profitability of the project to the initial investment cost. It is the ratio of the present value of expected net cash flows over the project's lifespan to the investment cost (i.e. Viviers and Cohen, 2011).	$PI = \frac{\sum_{t=1}^T \frac{CF_t}{(1 + r)^t}}{I_0}$

Source: Computed by authors

Due to the investment-oriented approach of this project evaluation, the economic performance of installing a scrubber is assessed according to several criteria and indicators as shown in Table 1. Panels A and B of Table 1 display the statistics and definitions of all the input-data, indicators and indexes used for investment evaluation and economic performance assessment of the study case. Panel A reports the inputs of the investment evaluation and the baseline results of based on the estimations cost-benefit of the first operating year; whereas, Panel B displays the conventional investment evaluation criteria based on the overall project lifespan.

Speaking about the capital costs of a sulphur scrubber investment for our particular ship case, Table 1 (Panel A) shows that the initial cost of the equipment (i.e. scrubber price) equals approximatively to €5.68 million. It is

noteworthy to say that the price of a scrubber tends to largely vary depending on the scrubber engine installed power and size, as well as the specific of ship operating fuel consumption.

The results of the costs analysis for the scrubber technology gives interesting findings of the project investment feasibility. First, the estimated annual scrubber capital expenditures (CapEx) are in the order of €5.68 million the first operating year. In addition to the price of a scrubber, the CapEx includes the costs of installing an exhaust gas cleaning technology on board the vessel (e.g. internal combustion engine, piping, etc.), start-up costs (10% of total capital costs) and other additional costs related to the engine power (weighted by 58 coefficient) and the unit-fuel cost (weighted by 0.5%). The additional capital expenditures are relatively insignificant compared to the initial price scrubber. For conveniently, we retain that the scrubber price proxies CapEx. The estimated annual scrubber operating expenditures (OpEx) are in the order of €4.24 million the first operating year. These costs incorporate consumable costs: additional scrubber fuel consumption (10% of HFO consumption), scrubber services (2% of investment cost) and other additional operating expenditures related to the vessel engine power and scrubber technology (e.g. sludge disposition in port, cost of chemicals supplies, periodic inspections and repairs, minor tests and adjustments to performance monitoring, water management system, etc.) (IMO, 2015); and financial operating costs: financial-interests costs of scrubber (6% interest rate) and depreciation. All annual operational scrubber expenditures are adjusted to 2% inflation-rate through the investment period. More interestingly, according to DNV GL (2018), the operational costs for methanol are expected to be compared with those for oil-fuelled vessels without scrubber technology. This simply implies that the OpEx costs associated with installing a scrubber technology to comply with the SECA requirements on the BSR could not be considered as a business constraint.

Before proceeding further, it is primarily important to clarify that installing a scrubber might take about 2 weeks to six months, which will be a lost revenue period also called off hiring period (Ruiz-Cabrero et al., 2017). However, this consideration will not be taken independently into account in the costs analyses approach, because it is implicitly considered in the annual scrubber operating costs.

Furthermore, Panel A of Table 1 shows that money-saving capability of the scrubber (OpEx) using low-sulphur fuel and a SO_x scrubber relies on the daily spread prices between HFO and MGO prices. The authors followed a dynamic-based approach and construct the average fuel prices on the observed daily fuel prices over four years (2013–2017), i.e. using the average annual prices and the annual volatility of prices. On average, the daily spread prices are close to €214 with €52 standard deviation over the period spanning from 2013 to 2017. The spread prices were relatively constant, high and less volatile for this period of study; though, the HFO prices drop to €81/bbl at the beginning of 2016.

Against this backdrop and statistics, the authors assess how OpEx and CapEx contribute to the total investment in a scrubber and the feasibility of switching to low-sulphur fuel as well as the scrubber adoption. Similarly, the results show that the relative operating expenditures (OpEx) and the relative capital expenditures (CapEx) to the investment cost of installing scrubber (i.e. the price) are around 15% and 13%, respectively; which cannot be economically seen as a burden for the feasibility of the business.

From this, the result in Panel A suggests that the annual spread savings, due to this shift to low-sulfur fuel, is €4.77 million; and thus the balance of the cost-benefit analysis, i.e. the saving-OpEx indicator, accounts for approximately €3.25 million and the net present value (NPV) of the first is €–2.43 million.

Alternatively, the discount rate is fixed as an imputed data; while the conventional criteria of the investment evaluation: the NPV_{15y.}, discounted payback period, the IRR, the MIRR and the profitability index are calculated based on the expected future cash flows, occurring at the end of each year over the investment lifespan (i.e. 15 years). In this case, the expected cash flows are estimated based on fuel prices predictions, annual predicted spread savings (HFO versus MGO costs), annual OpEx and annual CapEx expenditures.

Results in Panel B of Table 1 show that the project of a ship scrubber has a positive present value, which reveals that the wealth generated by this investment is attractive and economically viable. The project will, therefore, raise the value of the shipping company (by €22.22 million euros), which is the financial objective of the shipowners. Hence, the conclusion is that installing a scrubber is relevant and should be undertaken and can be implemented successfully. Interestingly, the initial investment in the scrubber is recovered during the second year and the investment payback occurred after 1.69 years (i.e. break-even point). By implication, this means that the operating costs and the capital expenditures are recovered by the income inflows generated by the project to break even within approximately two years. Furthermore, the results show that the IRR equals to 57% and MIRR equals to 21%, supporting the acceptance of the scrubber investment since these rates exceed the cost of capital, i.e. indicating that the benefits exceed the WACC. MIRR is substantially lower than IRR since the MIRR assumes that project cash flows are reinvested at the cost of capital (instead of the project's own IRR). Lastly, the profitability index shows that the relative profitability of the project is greater than the threshold value of 1-one. Thus, the scrubber investment is expected to produce €5.01 cash inflows for each €1 of investment.

However, production uncertainties were not considered in this evaluation of performance, though it has to be considered carefully, although the NPV calculation only contains the endogenous value of the scrubber investment. As previously stated, this evaluation can be regarded as the first step leading toward real options valuation (ROA), as the ROA is used to overcome those uncertainties. Thus, the application of ROA in evaluating this project will be presented in the next section.

4.1. Investment evaluation using the ROA (Real Options Analysis)

In the application of the ROV (Real-Options Valuation) to evaluate the project using the binomial approach and the Black & Scholes model, two assumptions are taken into account. First, all data provided by traditional evaluation methods are considered, all estimations are conducted based on the cash flow of the first operating year. Other necessary data are unavailable such as future oil price and future scrubber price; however, since the primary objective of this study is to compare traditional investment evaluation method with the ROA methods, these drawbacks may be disregarded.

In contrast to the ships' operational costs, the cost of the scrubber itself is not usually affected by high levels of uncertainty. As a simplified assumption, other uncertainties such as technological changes or environmental policies were not considered. Moreover, since in the case of fuel switching, fuel costs will not have a significant impact on operating costs their values were not introduced. Thus, the primary uncertainty factor is the volatility of fuel prices. The prices considered were the fuel prices of long-term contracts and the average price of the EU main ports for the three years 2015, 2016 and 2017. For the research, spot prices were not included because they may have been strongly influenced by short-term factors such as demand and supply, new regulations, etc. Mean and standard deviation of 963 days IFO380 prices were calculated using yearly-basis rolling windows, reaching 399 €/mt and 178 €/mt, respectively. Then, a simulation with 1000 interactions was conducted to calculate the fuel volatility. The results show an annualized standard deviation of 31.44% approximately, corresponding to the project projected volatility.

It should be noted that investment in a scrubber is not implemented in phases, i.e., the probability of stopping scrubber running after its start-up is low. Given the current economic situation, policymakers may not willingly support its development or make it a priority. More so, legislation could change in the coming years, limiting the feasibility of the scrubber project making the cost of a new scrubber installation or retrofit unstable. In a worst-case scenario, the cost could still be subject to ship-freight rate uncertainty as well as fuel prices in the open market. Therefore, the option of deferring the project within one year can be considered and is justified by the high uncertainty of regulatory change.

Therefore, for the scrubber investment, a deferral option corresponds to a call option, where the decision for a present investment will be taken if the NPV of the scrubber project exceeds the value of the option. These options are typically evaluated through the binomial tree, developed by Cox, et al. (1979). The parameters used to build the tree are displayed in Table 2.

Table 2. Inputs for the Real-Option Analysis

Input data	Value		Description
Present value of future cash flows S	€3.25	Million	Saving-OpEx of the 1 st operating year
Volatility σ	31.44%	Annual	Variance of fuel prices
The risk-free rate of return r	11%	Annual	WACC
Time to expiration T	15	Years	Duration
Time step Δt	1	Year	Analysis period
Investment cost K	€5.68	million	Strike price

Source: Computed by authors

The investment horizon in a scrubber is 15 years, the initial outlay is €5.68 million, the estimated cash flows in the first year is \$1.5 million and its uncertainty (volatility) is computed as 31.44%, as shown in Table 1 above. The risk-free rate of returns would represent the return rate of treasury bonds with a maturity of 10 years in EU added to the opportunity cost of capital. The binomial tree results show a possible evaluation of the underlying asset price and the deferral option from left to right. Regarding the underlying asset, the value presented by the first node of the tree is the current price of the underlying asset (i.e. and the end of time t-1). As shown in the table in Table 3, the underlying asset value can increase or decrease depending on coefficients V_{Max} and V_{Min} respectively (see Equation 2).

Table 3. Key parameters of Real Option-Value

Input data	Calculated parameters	Source
Up factor (V _{Max})	2.12	Equation 3
Down factor (V _{Min})	0.47	Equation 3
Risk-neutral probability (p)	0.60	Equation 4

Source: Computed by authors

After identifying inputs factors required for setting up binomial model, the lattice's up-factor and down-factor, the authors thus construct the binomial lattice (tree) for the project's value, that approximates a lognormal distribution, and calculate the asset values on each node of the binomial lattice, using one-year time period. Currently, the present value of net cash flows (estimation of the first-year inflows) is S₀=100m, and the annual volatility of S₀ is σ =31.44%. The time of options maturity was divided into several one-year phases. The results of a recombining lattice are displayed below in Figure 1. For analytic purposes, the truncated values of the lattice is reproduced below.

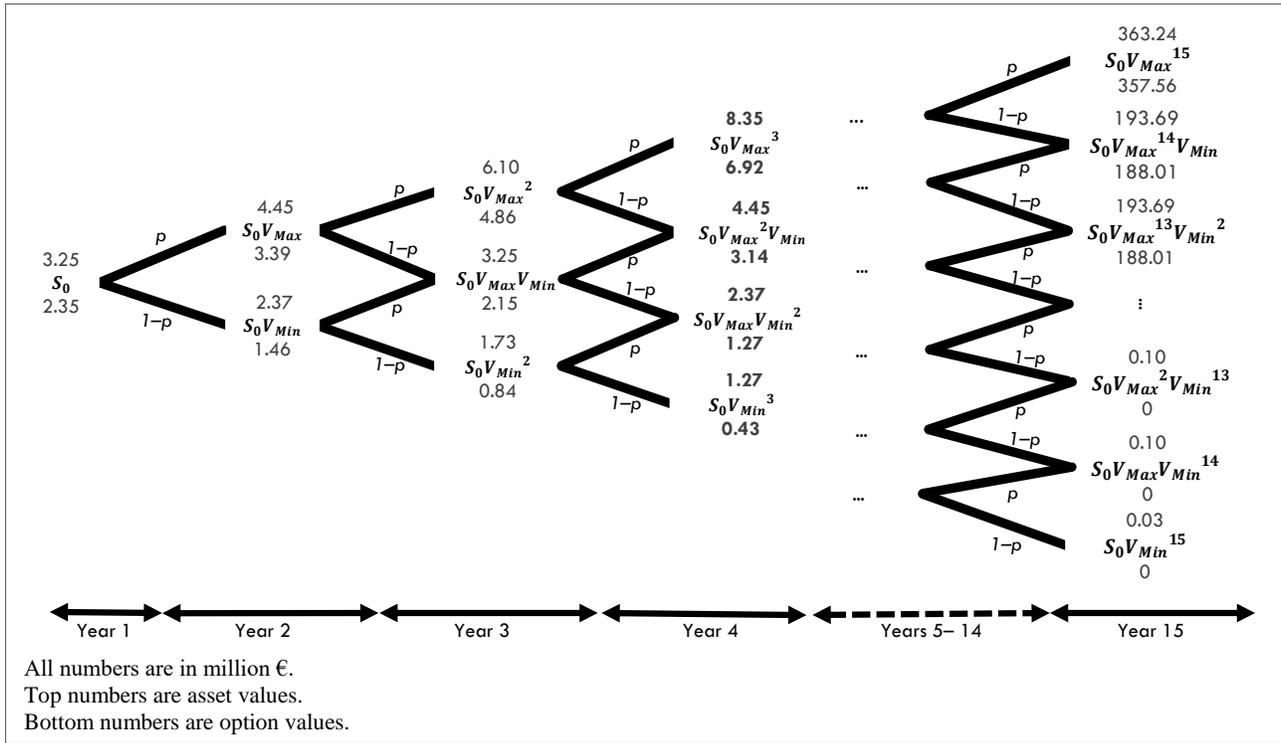


Fig.1. Tree for option to wait
 Source: Computed by authors

Figure 1 forms the diagram of sequential decisions and possible ROA results. Upon completion of each phase, project management has the option whether to invest in a scrubber at that point or delay its implementation and wait until next period. Thus, the binomial lattice (tree) presents the diagram of the next periods' project's random values conform to the value of expected cash flows arising from investing in the scrubber, S_0 , multiplied with the up-factor and down-factor to obtain S_0V_{Max} and S_0V_{Min} . These two factors generate random project's values (i.e. present value of cash flows) so that the original S_0 volatility is preserved. For instance, it was verified that at the end of the first year, the project cash flow values conform to $S_1(up) = S_0V_{Max} = €4.45$ million and $S_1(down) = S_0V_{Min} = €2.37$ million. The investment option's values in the end of the second year show three scenarios: $S_2(up - up) = S_1(up)V_{Max} = €6.10$ million, $S_2(up - down) = S_2(down - up) = S_1(up)V_{Min} = S_1(down)V_{Max} = €3.25$ million and $S_2(down - down) = S_1(down)V_{Min} = €1.73$ million. Additionally, this binomial option-pricing model assigns two associated probabilities to the various nodes that constitute the diagram. Hence, Results shows that the asset value has to be corrected by two coefficients: $p=0.60$ and $1-p=0.40$ (see Equation 4). Finally, as seen in the diagram, the options gave only the right but not the obligation for the manager to make the investment, implying that the payoff scheme to the option holder/ship owner is asymmetric.

Similarly, with the same procedure, the calculation is repeated to show the expected values of option values for every node of the binomial tree until the last year. In Figure 1, the upper numbers on the binominal lattice present expected future asset values over the options life period and bottom numbers indicate option values.

The last column of the binomial tree represents the possible values of the underlying asset at the option maturity date. Since the deferral option is similar to a call option, the last values of the tree are determined by subtracting the values of the underlying asset to the exercise price. The result can fluctuate between $(S - K)$ and 0 with the option value S and the underlying asset price K . The other values are determined by the application of a neutral probability

to each pair of vertically adjacent values. The result shows that a scrubber project value in the first year with the option of delay in the binomial tree is €2.35 million, higher than the NPV of the first year which equals €-2.43 million (this value represents the difference between Saving-OpEx and CapEx of the first-year estimations (see Panel A of Table1)); hence, with high volatility of the market conditions the ROV value exceeds the NPV from investing in scrubber ‘‘today’’. Thus, it is better to postpone the investment decision.

Furthermore, an option value of delay is offered by calculating the difference between the expanded NPV (predict future cash flows, i.e. ROV) and the computed NPV of the 1st operating year which yields a value of €4.79 million and suggests that the deferral option value is higher than the value of investing immediately. Creating a shortened outcome or a shortcut investment in the NPV analysis will be negative in the first year, a situation not so surprising for such a significant investment. Thus, the project can be postponed until more favourable investment conditions appear.

Since investment decisions are subject to opportunity costs in regards to deferring, the investment should be made only when its NPV is higher than the value of the option. This result is so because an immediate investment implies a loss of opportunity to invest later and corresponds to the value of delaying the option. Even though the value generated by the scrubber project cannot make up for the total cost of investment, it would be sufficient to cover the deferral option. If these assumptions are applied to a binomial tree, the decision tree of current investment will signal to ‘‘invest’’ or ‘‘delay’’, at each node, which simplifies the decision-making processes for managers. The advantage of using the binomial tree for a case like this is that the result will show if the option of investing now is better when the underlying asset reaches a higher value. If the underlying asset has a lower value, then the option of postponing the project for the next period would be a better choice.

Thus, the investor will only invest if the evaluation of bunker fuel remuneration exceeds the investment initial cost together with the opportunity costs of not postponing the project for one year ahead. Since the project presents a low static NPV in the first year (despite its positive outcome over the years), it will be necessary to invest €5.68 million in implementing the scrubber project immediately or facing an increase of value in the daily ship fuel consumption. This action will risk a decrease in the cash flow as well as a decrease in the cost of the underlying asset. For example, after 4 years and 15 years, the investor will obtain future cash flows of €8.35 million and €363.42 million respectively, according to the lattice values. Having this amount of underlying asset value is a motivation for the investor to invest because the value compares to the option value is positive. Whereas at a pessimistic scenario of making future cash flows of €1.27 million and €29 102, the underlying asset value confirms that a risk avoidance will be a better option. On the other hand, a negative option price will be a signal not to take the risk of investment. This way, even with a positive NPV static the tree shows that the project should be postponed because the value of the deferral option is superior.

Next, using the approach outlined in the Equations 5, 6 and 7, the Black-Scholes option valuation model was used to calculate the real call-option value by specifying the required parameters to set-up the Black & Scholes model (1973), which are the same as in binomial option-pricing model: i.e. the initial cash flows, the volatility of the project, etc. (see Table 2). Herewith, once the inputs parameters required for setting up the model are identified, then the call-option value is calculated using Equations 5, 6 and 7. Results are as follows (Table 4):

Table 4. Values obtained with the Black & Scholes model

Input parameters	Value
d1	1.51
d2	0.29
Value of the call option: C	2 366 992.83 €

Source: Computed and constructed by authors

The results display the value of the real option (C) and the deviations from the expected value of the normal

distribution (d1 and d2) by applying the Black-Scholes model. As described above, the estimated value of the real option (ROV) in $t = 1$ by Black & Scholes option is positive and approximately amounts to €2.37 million, which does not imply that this project may be accepted and undertaken immediately. Realistically, this suggests that the investor should hold the option of this project investment and retard the investment, but not abandon the project. It also indicates the implicit value of taking the flexibility and the option into account. The large size of this value can be explained by the high volatility of the project’s cash flows (31.44%) and the significant long lifetime of the option (15 years). Note, that this situation is not surprising for such a significant investment. Similarly, to the binomial model, the option value of delay is measured by adding the ROV amount to the project’s NPV of the first-year leaves us with the extended strategic NPV equalling: $-2.43+2.37=€4.80$ million, which suggests that the deferral option value is substantially higher than the investment. Thus, in this case, also, the implication is that the investor would postpone the full project program and decide to operate it in next coming periods until better investment conditions appear. In all, the authors found the results provided by Black & Scholes formula converge to those provided by the binomial option-pricing approach, under certain assumptions.

4.3. Monte Carlo Simulation and further investigations

In this subsection, the stochastic Monte Carlo simulation is developed for the analysis of the NPV, for the investment analysis. Hence, in Table 5 below, the project scope and the inputs parameters that lead to implementing the stochastic simulation of the project valuation is defined and identified.

Table 5. Parameter used in calibration of Monte Carlo Simulation

Inputs parameters	Value	
Initial NPV _{15y.} (S_0)	€25.24	Million
Volatility (σ)	31.44	Percent
Drift (μ)	[0–1]	Random number
Trials	1000	Iterations

Source: Computed by authors

Using the approach outlined in the Equation 5 with a normal distribution, thousand unique iterations of the Monte Carlo simulation is conducted to obtain randomly the possible project values and generate a sample of the NPVs of the asset valuation paths. The most important assumption underlying this Monte Carlo model is that the generated variables (i.e. NPVs) are independent. The primary outputs of the Monte Carlo simulation, the parameters and the main descriptive statistics of the NPV of the project over the whole investment period, are presented as follows in Table 6.

Table 6. Summary statistics and Risk analysis for the simulated NPV of the Monte Carlo Simulation

Inputs parameters	Value	
Average	€14.97	Million
Median	€14.78	Million
Standard Deviation	€5.02	Volatility, Million
Min	€0.90	Million
Max	€29.67	Million
Asymmetry	0.12	Skewness
Flattening	-0.28	Kurtosis
VaR ^{1%}	€4.58	Parametric Value-at-Risk at 1% quantile, Million.
VaR ^{10%}	€8.47	Parametric Value-at-Risk at 10% quantile, Million.

Source: Computed by authors

Table 6 displays the primary outputs of the Monte Carlo simulation and presents descriptive statistics and

characteristics for the distribution of the one thousand estimated NPV iterations. Overall, within these data, the average (median) NPV is €14.97 million (€14.78 million), which is slightly lower than the estimated NPV in the project analysis that equals to €22.76 million over the whole 15-years lifespan. Dispersion in this NPV is relatively low with a standard deviation of €5.02 million, which is strongly reliant on fuel prices volatility. Across these data, an interesting result is that the NPV is simulated plausibly positive in all the experiments. Therefore, looking at the minimum and maximum values, results of the Monte Carlo iterations reveal a positive minimum value (€0.90 million), thus ranging the NPVs from €0.90 million to €29.67 million (maximum value). Moreover, aforementioned, the asymmetry (skewness) is 0.12, which shows a slightly expanded distribution to the right; and the flattening (kurtosis) stands at -0.28, indicating a slight flattening compared to a normal distribution.

Therefore, these empirical results and the absolute positive value of the simulated NPVs give support to the previous findings, implying that the project will deliver an acceptable NPV and so the relevance of undertaking scrubber technology.

Based on data obtained, the graph of the distribution of frequencies and cumulative frequencies cumulative diagram (probabilities) for the one thousand NPV iterations of the project are drawn in the following chart.

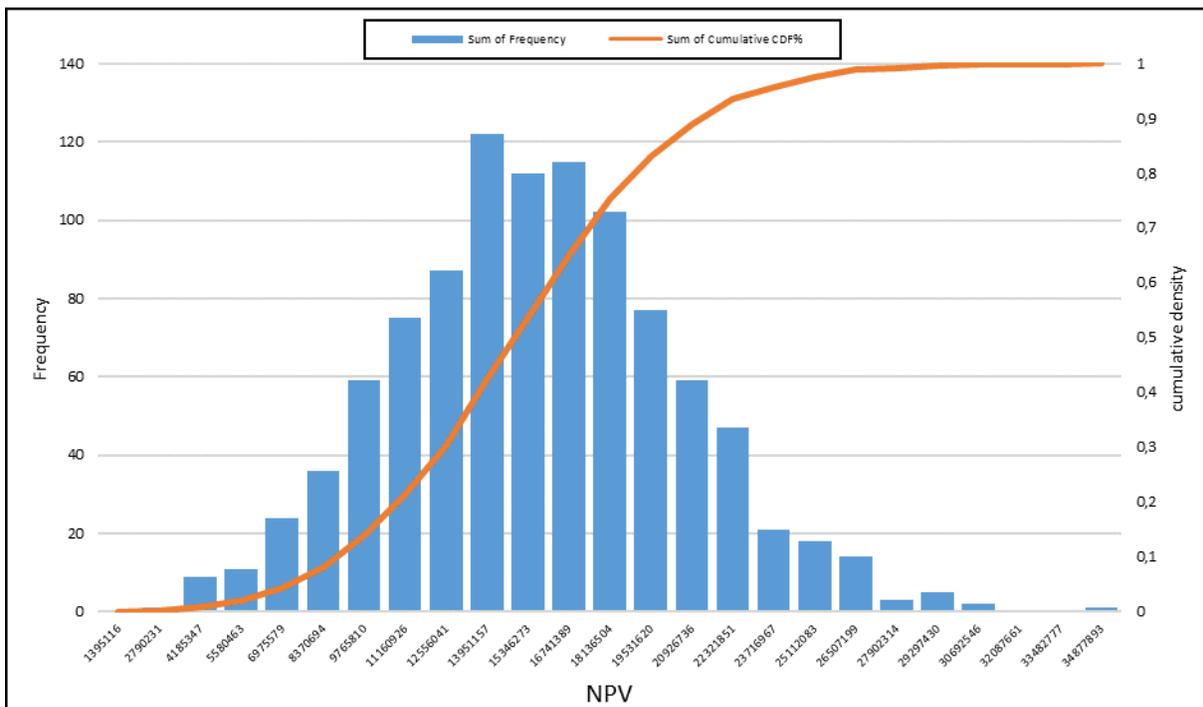


Fig.2. Probabilistic distribution of the simulated NPV_{15y}

Source: Computed by authors

Figure 2 presents the histogram of the Monte Carlo simulation results (frequencies and cumulative distribution function—CDF for the one thousand NPV experiments). As can be seen, there is strong evidence that the frequencies of the project value are normally distributed. Implications of Monte Carlo simulation drawn in Figure 2 show that 60% of the analyzed cases of the NPV are higher than €13 million. Also, it results in a probability of approximately 22% that the project value will be higher than the initially estimated project value (€22.76).

In the same stream, according to these results and the CDF, risk analysis of the Value-at-Risk indicators at 1-percent and 10-percent quantiles give interesting insights. Hence, the investors would have 99% (90%) confidence that the

project expected NPV over 15 years will generate at least an amount of €4.58 million (€8.47 million).

To address the nexus between NPV and ROV for the results obtained from the MCS, the authors process primarily by evaluation the option value (discounted by the risk-free rate) for each iteration and then calculate the average ROV of these one hundred iterations. Simulation results show that the average value of the real-option in the 1st operating year is positive and approximately equals to €1.79 million. Additionally, the option value of delay is computed as the difference between the ROV and NPV (i.e. the value-added) which amounts to a value of €4.22 million. This also supports previous findings; hence, the investor will face the decision to accept the option of the project investment, but with postponing the full project program until better investment conditions appear.

Not surprisingly, the parallel Monte Carlo simulation results, with the same input data of an option traded at 31.44% and 1000 random trials, present very similar findings to those obtained with the binomial approach and the Black & Scholes model. These results are by and large in line and consistent with the main findings of the other approaches on real options analysis.

4.4. Discussion

Under the same procedure and assumptions, results had given comparative option values at the first operating year. This gives a perception that the value of the introduction of a new scrubber investment is approximately the value provided by the binomial option-pricing model, the Black & Scholes option valuation model or the Monte Carlo method. Overall, throughout the analyses, the results are reliable and robust to various methodologies and they are not driven by any specific specification.

In contrast, when comparing the binomial results in the first year with the results of Black and Scholes, a small difference appears as shown below in Tables 7, where the three different approaches are compared with the conventional NPV calculation for the first operating year. These first-year results give useful insights to the investors when they gauge the project investment. They also allow them to decide about the best investment timing, i.e. either to launch it *today* or to postpone it for the next following year; to acquire enough guarantee about the uncertainty of the fuel market conditions and the inherently unstable nature and risks of the industry than *today*. Therefore, certainty and visibility are the essences for an investor. Subsequently, with less volatility of the market condition and a clear vision of the industry, the investor/stakeholders can generally decide easier to whether the investment is profitable in term of value creation and in line with the new regulation, or not; and the whether the payback period is satisfying or not. Thus, in presence of good economic conditions such as fewer volatility pressures or low-interest rates, there is no point to decline or postpone the investment.

Table 7. ROA Comparison between, Binomial, Black-Scholes and Monte Carlo approaches

Method of option-pricing	NPV of the 1 st -year investment	ROV for the 1 st -year of investment	Value added (Difference between ROV and NPV)
Binominal	- 2 432 655.33	2353753.78	4 786 409.12
Black-Scholes	- 2 432 655.33	2366992.83	4 799 648.17
Monte-Carlo	- 2 432 655.33	1789960.35	4 222 615.68

Source: Computed by authors

Although these option-pricing methods provide similar insights, prior studies have provided some criticisms. Hence, to benchmark our findings, previous studies in the literature (Acciaro, 2014; Glasserman, 2013) have argued that using Black & Scholes method and Monte Carlo simulation are not favourable for investment analysis, especially for the call and put option in ROA. For example, they documented that the Black & Scholes results might not provide a historical normal distribution and the Monte Carlo results are generated from simulations and random numbers, which do not follow a particular trend nor a probability distribution. To that extent, compromises can

always be made between the three different ROA pricing approaches.

Considering the setbacks mentioned, the binomial option-pricing method could be said to have an advantage over the Black & Scholes and Monte Carlo methods, as it gives flexibility of decision-making over an extended period of investment. In contrast, the other methods focus only on a specific time slot, e.g. in the last year of binomial option-pricing, the investor thereby could decide only if there are favourable conditions to invest, as far as the option to defer the project is no longer possible. In such case, the investor can only invest if the spread value of the two main fuel prices is sufficiently (or expected to) high.

Furthermore, the project value grows as the decision is postponed, due to the implied uncertainty reductions. Nevertheless, the option to defer in the binomial case might involve losses in cash flows and competition. Thus, the decision whether the project will be implemented or not can only be made if these losses are taken into account in the final decision. This suggests that although the conventional investment method does not consider this flexibility, which underestimates the project value, the incorporation of ROA alongside NPV evaluation increases the project estimation accuracy because it gives room for a project deferral. Indeed, over the full investment period, our insights of the conventional investment evaluation indicators (Panel B of Table 1) and the MCS simulated outputs (Table 6) suggest that the project presents a good investment opportunity over a long-term run.

Finally, the ROA approach allows the investor to define the best investment opportunity and decisions with the highest return for regulation compliance. The results indicate that the best short or long-term investment and capital budgeting strategies for the future of maritime companies with significant value can be considered at the early stages of a new ship investment or scrubbers retrofit device for older ships. By assessing different scenarios of the scrubber investment, the ship owners can maximise the benefit of their asset.

Conclusion

The objective of this work was to validate methods that can solve investors' challenges of SECA compliance investment decisions to avoid loss and maximise profit using the scrubber abatement technology. The results validate a stochastic approach for assessing real options with a case study for compliance with sulphur regulations. From the analysis made, the application of ROA, in particular, the Binomial approach looks promising. Given this result, a potential investor has the flexibility to re-evaluate the scrubber project and redefine a new strategy if need be.

Getting similar results although slightly different by few points between ROA between the Binomial, Black & Scholes and Monte Carlo models demonstrates that the real options approaches are practical for simulating various investment scenarios with the different situation of future oil prices. This paper contribution is new to the maritime industry that is highly characterised by burdensome uncertainties because it integrated the valuation of the payback period and discounted cash flow of the low sulphur fuel like the MGO versus the scrubber technology option as a popular solution. The findings prove that the Real-Option approach as an investment evaluation method could be a reliable and worthy approach. Investors in the maritime industry can thus rely on and take advantages of this method. The obtained results bear critical policy implications for the industry operators, the regulators of the SBR, and the IMO.

Further work will be directed towards benching marking these results with LNG driven ships. This will create a more precise picture regarding compliance investments and reduce investment decision risks.

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MODEL OF SUSTAINABLE REGIONAL DEVELOPMENT WITH IMPLEMENTATION OF BROWNFIELD AREAS

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Abstract. The article highlights the potential of brownfield areas in the sense of the rules and principles of sustainable development of the regions which shows significant disparities determined by the developmental tendencies of the socio-economic and environmental spheres, whose interactions were its basic platform in the Slovak Republic in the last years. Brownfield areas, with a degree of degradation and environmental quality depending on their type and original use, have a negative impact on all mentioned spheres of regional development, since such sites are unused and represent so-called brown investments, i.e. areas from which the region has no benefit. From the explicitly defined positive and negative determinants of the actual occurrence of brownfield areas in terms of sustainable development of the regions, the article quantifies their prioritization in the process of implementation into the regional development model, accepting the principles of Saaty matrix which is objective from a process perspective of sustainable regional development. Based on the explicit quantification of the above-mentioned determinants, the categorization of brownfield areas in the process of sustainable regional development, including the model of regional development with implemented brownfield sites, whose actual occurrence supports the occurrence of diversified activities, reduces the price of the surrounding land and ultimately threatens the health of the affected population and reduces the price of surrounding lands.

Keywords: brownfield areas; sustainable development; model of regional development; Saaty matrix

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1. Introduction

Sustainable development can be defined as the environment as “a development that preserves the opportunity to satisfy their basic living needs to the present and future generations while not diminishing the diversity of nature and preserving the natural functions of ecosystems” within the meaning of § 6 of Act no. 17/1992 Coll. on the Environment. Based on the fact that brownfield sites are an integral part of the environment of individual regions whose presence is negative (Pavolová et al., 2012, Khouri et al., 2016) it is necessary to eliminate their real occurrence and focus on sustainable development towards brownfield sites themselves in interaction with their reuse (Pavolová et al. 2012; Brzeszczak & Imiołczyk, 2016; Dobrovolskienė et al. 2017). In the view of the above mentioned, sustainable regional development with an implemented system use of brownfield sites can be characterized as a strategic, complex and synergic process determining the socio-economic, environmental and institutional aspects of regional development, profiling a functional model of anthropogenic society eliminating the interventions that threaten, damage or devastate the living conditions, adequate use of natural resources and protection of cultural and natural heritage (MoE SR, 20%; Melichova et al., 2017). In the reality of growing international competition, entrepreneurship is crucial for building effective economy both at national and regional level (Ignatavičius et al., 2015; Agrawal, 2016; Pietrzak & Balcerzak, 2016; Cseh Papp, 2018; Tvaronavičienė, 2016; Saeed et al. 2017; Meyer et al., 2016; Yan et al., 2017; Brzeszczak & Imiołczyk, 2016; Melas et al., 2017; Ponomarenko et al., 2018; Razminienė & Tvaronavičienė, 2018).

2. General characteristics of brownfield areas from the point of their implementation in the sphere of regional development

Brownfields were created as a result of restructuring of the states and their individual regions. They are one of the consequences of radical changes in the socio-economic structure characterized by the shift of labor from primary (agriculture, forestry) to secondary (industry and construction) and nowadays into tertiary (trade, transport, services, public administration) spheres of civil life. Brownfield areas are a turbulent problem and an obstacle to further sustainable development in the regions as they are characterized by obscure property rights and layout, devastated production and non-production buildings and, in many cases, by the presence of old environmental burdens. These are represented by various substances, often toxic, that contaminate all the components of the environment (soil, surface and ground water, air, biota) as well as by material objects. On the particular land and in the particular buildings waste, including hazardous waste from the previous use of the land and buildings is often collected or temporarily stored. Significant risk is the remnants of machinery and technology that may contain chemicals that are hazardous to the environment and human health (PCBs, dioxins, etc.). Surroundings of brownfield areas are clearly visible and especially dangerous (Pavolová et al., 2012). The degree of degradation of brownfield areas and the level of environmental quality depend directly on their type and original use, which also determines the financial means associated with their revitalization in favour of sustainable regional development. This fact is also complicated by different understanding of brownfield areas in selected countries of the European Union (Table 1), which also complicates their implementation in a unified definition of sustainable development (Pavolová & Kyseľová, 2011; Beck, 2016; Tvaronavičienė & Razminiene, 2017; Mura et al. 2017). Their elimination would not only contribute to the improvement of the environmental quality but also to further socio-economic development of the regions where the brownfield area is located, including the primary, secondary and tertiary sphere of small and medium-sized enterprises in the SR which is in direct interaction with the sustainable regional development. The implementation of brownfield areas in the sustainable development of regions also directly depends on their generally defined positive aspects in a particular region as shown in Table 2 (Pavolová et al., 2012).

Table 1. An overview of brownfield definitions in selected countries

Country	Definition of brownfields areas
Bulgaria	Contaminated land - areas in which previous activity has ceased, however, still have influence on their surroundings
Belgium - Wallonia	Places formerly intended for economic recovery, where the status quo is not an efficient use of Flanders: An abandoned or underutilized industrial area with potential for active recovery or expansion, which is further complicated by the development of real or anticipated environmental problems
Czech republic	Brownfield is a property (land, building, complex), which is underused, neglected and may be contaminated. There is a remnant of the industrial, agricultural, residential, military or other activities. Brownfield is not used appropriately and effectively without the normal process of regeneration.
Denmark	Contaminated areas.
France	Previously, land use, are now temporarily or permanently abandoned due to attenuation of activity and need to find a possible future use. They can be partially built, derelict or contaminated.
Finland	No definitions.
Ireland	The abandoned areas - areas that have lost or losing their original character and negatively affect their environment due to their dilapidated, disrepair, or the presence of waste
Italy	Contaminated areas - areas that are chemically, physically or biologically contaminated in such a way that endangers human health or the surrounding buildings or landscape. The area is considered contaminated when contamination exceeds the limits set by law.
Hungary	The territory which had formerly been used economically efficient, but are currently underused, stopped. The main feature is the neglect, dereliction and contamination
Poland	Cancelled due to contaminated areas - high density of landfills
	Impaired / deserted area usually built within urban areas
Spain - Basque	Potentially contaminated areas / derelict industrial buildings
Slovakia	Brownfield is a property that is not effectively used, is neglected and possibly contaminated. This is a property that can not be effectively used without a process of its regeneration.

Source: Pavolová, Kyseľová, 2011

Table 2 Positive aspects of the removal of brownfields areas in

Removal of threats	elimination of health hazards (toxins, carcinogenic, teratogenic, mutagenic, other contaminants), physical hazards (unstable structures, wells, risks of floods and flooding, burning dumps, etc.).
Removal of costs incurred in the destination area to no avail	elimination of the cost of the brownfields area without benefit to ensure the safety, infrastructure and other social costs
The acquisition of new land and development opportunities of destination	importance in regional destinations with a small development area, minimizing the occupancy of new plots and the possibility of using them preserving the natural environment for the benefit of regional development
Increasing the attractiveness of regions	improving the image, quality of the environment, life, positive aspect of value and further development of the region in all areas of sustainable development

Source: Authors

For all of the above reasons, cities and communities have to be aware of “their brownfield sites,” make them aware in the preparation of territorial documentation and engage in both formal and informal support for their revitalization and re-use to help private sector investments which are necessary in their revitalization in promoting the sustainable development of the regions. For the needs of brownfield sites implementation in the sustainable development of the regions it is necessary to prioritize their negative and positive determinants which, in their synergic effect, will point to their categorization and position in the process of reducing the interregional disparities which show significant differences with a pronounced polarization in Bratislava region, which is also documented by Fig.1 on the occurrence of brownfield sites in the SR in recent years. According to the available data and the occurrence of brownfields in the SR it can be stated that the largest area of brownfields is located in the regions of eastern Slovakia, up to 35.97%, i.e. 641.4 ha of the total area, but this is not true about their number

because the most brownfield areas are located in the regions of Central Slovakia up to 42.08%, i.e. 287 of the total number of brownfields occurring in the Slovak Republic according to this criterion. (Fig. 1).

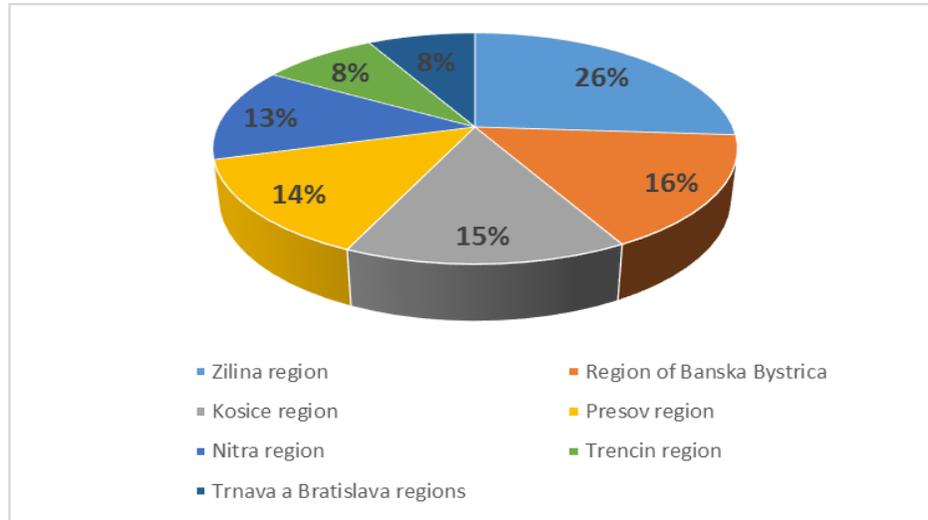


Fig.1. Brownfields in the Slovak Republic
Source: SARIO

3. Methodology of determinants quantification for the implementation of brownfield areas in the process of sustainable development of regions

Analytic Hierarchy Process (AHP) is a multi-criteria decision making method, originally developed by mathematician Thomas L. Saaty, and is a tool with numerous applications in areas of planning and management (Saaty T. L., 1980). It can be used for evaluations of different problems in urban landscape management (Li, 2005; Simo et al. 2016; Srdjevic, Lakicevic, & Srdjevic, 2013; Grancay et al, 2015; Svec & Madlenak, 2017; Dolobac et al., 2015; Kim & Sato, 2000; Adamisin et al. 2018). AHP uses a pairwise comparison method to generate weightings (ratio scales) for criteria, instead of simply listing and ranking the levels of importance. There are some methods (Benda-Prokejnová et al., 2017). Saaty's method of weighting the criteria is done in two steps. First we determine the matrix of the intensity of preferences S . The elements of the S -matrix, which we call s_{ij} (i -th line, j -th column), are obtained by examining the number of times the criterion K_i is more significant than the criterion K_j , if it is more significant or as significant as . This ratio of the significance of two criteria, which is expressed by elements s_{ij} , can also be interpreted as the ratio of their weights:

$$s_{ij} = \frac{v_i}{v_j}, \quad i, j=1,2,\dots,m \quad (1)$$

Based on the number of times the criterion is more significant than, we assign the elements of the intensity preference matrix S numbers from 1 to 9. (Ramík J., 2000). If it is K_j more important than K_i , we will define the elements s_{ij} as follows:

$$s_{ij} = \frac{1}{s_{ji}} \tag{2}$$

This relationship can be described as follows: If the criterion K_i is s_{ij} - times more significant than the criterion K_j . If for all elements of the matrix S the relation (2) holds, then we say that the matrix S is reciprocal. The second step is to determine the scales themselves based on the knowledge of the S matrix, which minimizes the expression (Talašová, J., 2003):

$$D = \sum_{i=1}^m \sum_{j=1}^m \left(s_{ij} - \frac{v_i}{v_j} \right)^2 \tag{3}$$

under the condition

$$\sum_{i=1}^m v_i = 1. \tag{4}$$

For the purpose of defining the prioritization of determinants of brownfield areas implementation in the sustainable development process of regions a tabulated overview was created in two areas – positive and negative determinants. All the determinants were added a numerical value of the weight by accepting the generally valid condition. This symmetrical matrix also corresponds to the fact that the method is based on the interactive comparison of all predefined determinants of the same rank with the evaluation in Table 3 (Hlavňová, Pavolová, 2017).

Table 3. Assessment of negative and positive determinants in Saaty matrix

Determinant Value	Description of Comparative Determinants
1	Determinants i and j are equivalent
3	The determinant i is slightly preferred over the determinant j
5	The determinant i is strongly preferred over the determinant j
7	The determinant i is very strongly preferred over the determinant j
9	The determinant i is absolutely preferred over the determinant j

Source: Hlavňová, Pavolová, 2017

Consequently, the values of 1 were assumed on the diagonal of the matrix, as we accepted the principle of comparison of the same factors, i.e. their equivalence, and identified pairwise comparisons of the individual factors. If the factor in the row is preferred over the factor in the column, the reciprocal value was attributed. Furthermore, the R_i values for each criterion were quantified, i.e. row of matrix created according to the formula:

$$R_i = (S_i)^{\frac{1}{f}} \tag{5}$$

f – number of factors,
 S_{ij} – particular factors.

Based on these calculations, the sum of R_i was calculated and based on it the final value of individual weights reflecting the interactions of the different determinants and their prioritization in the process of sustainable development of the regions was calculated.

4. Sustainable development model of regions with implementation of brownfield areas

In terms of the definition of sustainable development and the above-mentioned facts about brownfields it was possible to define their negative and positive determinants for their implementation into a systemic approach supporting the sustainable development of the regions. The negative determinant of the occurrence of brownfield sites in regions that hinder their sustainable development include: the decline in the economic performance of the region (D1), the greenfield competition (D2), the reduction of the aesthetic nature of the landscape (D3), the threat to the health of the population (D4), insufficient return on investments in brownfield sites regeneration (D5), the possibility of environmental burdens and associated additional investment to remediate them (D6), the occurrence of devastated buildings (D7), the non-use of brownfield sites in the development of the region (D8) and the reduction of the territorial ecological stability system (D9) and their weight values for the need to define their prioritization in the process of sustainable development of the regions were quantified (Table 4). Among the positive determinants of the use of brownfield sites in the systematic process of supporting the sustainable development of the regions were included: sustainable use of the area in the region (D1), support for social development (D2), increasing employment in the region (D3), promotion of economic development due to regeneration of brownfield sites and their re-use (D4), enhancing environmental quality by removing environmental burdens, (D6), increasing the purchasing power of the population (D6), and increasing the average wage in the region (D7) due to the re-use of brownfield sites by supporting small and medium-sized enterprises in the region (D8), increasing the competitiveness of the region (D10) and the improvement of population life quality (D11) and, by the same procedure, the values of their weights and the need to define their priority in the process of sustainable development of the regions were quantified (Table 5).

Table 4. Quantification of negative determinants of brownfield sites

Determinant	D1	D2	D3	D4	D5	D6	D7	D8	D9	S_i	R_i	v_i
D1	1	5	5	3	3	3	3	3	3	18225.0000	2.974	0.26
D2	1/5	1	7	1/3	1/3	1	3	1	1/3	0.1556	0.813	0.07
D3	1/5	1/7	1	1/5	1/7	1/5	1/7	3	1/3	0.0000	0.306	0.03
D4	1/3	3	5	1	5	3	5	7	1	2625.0000	2.398	0.21
D5	1/3	3	7	1/5	1	1/3	1	1	1/5	0.0933	0.768	0.07
D6	1/3	1	5	1/3	3	1	3	3	1	15.0000	1.351	0.12
D7	1/3	1/3	7	1/5	1	1/3	1	1	1/5	0.0104	0.602	0.05
D8	1/3	1	1/3	1/7	1	1/3	1	1	1/3	0.0018	0.494	0.04
D9	1/3	3	3	1	5	1	5	3	1	225.0000	1.825	0.16
Sum											11.533	1.00

Source: Authors

Table 5. Quantification of positive determinants of brownfield sites

Determinant	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	S _i	R _i	v _i
D1	1	3	1/3	1/3	1/9	1/5	1/5	1/7	1/7	1/5	1/5	0.000001	0.290	0.02
D2	1/3	1	1	1	1/3	1/3	1/3	1/3	1	1	1/3	0.001372	0.549	0.04
D3	3	1	1	3	1	1/3	1	1/3	1/3	1	1	0.333333	0.905	0.07
D4	3	1	1/3	1	3	3	1	3	1/3	1/3	1	3.000000	1.105	0.09
D5	9	3	1	1/3	1	1/3	1/3	1/3	1/3	1/5	1/3	0.007407	0.640	0.05
D6	5	3	3	1/3	3	1	1	3	1/3	1/3	1/3	5.000000	1.158	0.09
D7	5	3	1	1	3	1	1	5	1/3	1/3	1/3	8.333333	1.213	0.09
D8	7	3	3	1/3	3	1/3	1/5	1	1/3	1/5	1/3	0.093333	0.806	0.06
D9	7	1	3	3	3	3	3	3	1	3	1/3	5103.000000	2.173	0.17
D10	5	1	1	3	5	3	3	5	1/3	1	3	3375.000000	2.093	0.16
D11	5	3	1	1	3	3	3	3	3	1/3	1	1215.000000	1.907	0.15
Sum													12.839	1.00

Source: Authors

In terms of the quantified prioritization of negative and positive determinants it was found that the highest priority in preventing the use of brownfield sites, i.e. the negative determinants represented were the decline in the economic performance of the region (25.79%) and the reduction of the territorial system of ecological stability (15.83%) and the lowest priority were reduction of the aesthetic character of the landscape area (2.65%) and the non-use of brownfield sites (4.29%), while the highest priority of the use of these sites in the sustainable development processes among the positive determinants were increasing the competitiveness of the region (16.93%), increasing the tax revenues of municipalities in the regions (16.30%) and, on the other hand, the lowest priority were sustainable use of the regions in the region (2.26%), social development support (4.28%) (Fig. 2).

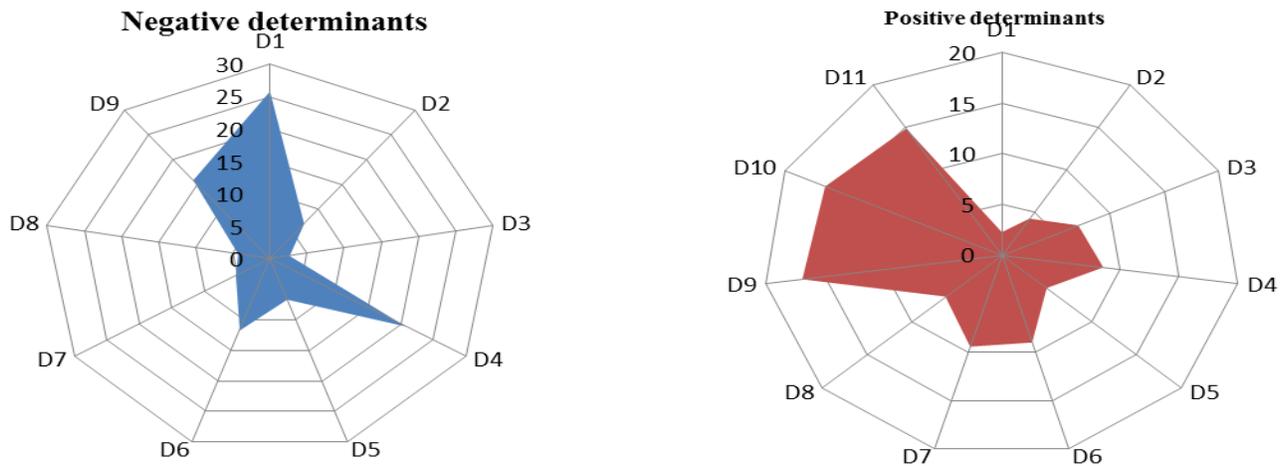


Fig.2. Prioritization of negative and positive determinants of brownfield areas in the process of sustainable development of regions

Source: Authors

The partial results of the prioritization of previously clearly defined single negative and positive determinants of the use of brownfield sites in the processes of sustainable development of the regions are consequently synthesized into a summary matrix of complex evaluation, which determines their implementation in the above mentioned processes in the form of a summary indicator – “Scoring Ratio” that could predict a specific category of regional development support in interaction with the ultimate benefit of investing in the regeneration and reuse of brownfield areas. Following the below-mentioned summary matrix of a comprehensive brownfield land use assessment in regional sustainable development processes (Table 6), it was found that the positive determinants of brownfield sites implementation in the sustainable development processes of the regions showed a prevalence (52.68%) above the negative determinants of their occurrence (47.32%), which hinders the development of the regions with a sum of 1.11 (Table 6), whereby it can also be predicted the category of regional development support and therefore the suitability of implementing brownfield sites in the sustainable development processes of the regions identified as IV. category, i.e. high support for the sustainable development of the regions, as the score ratio reached 1.71 (Table 7).

Table 6. A summary matrix of a comprehensive assessment of the use of brownfields in the processes of sustainable development of the regions

Determinants		Determinants Score	Partial Score	Scoring
the economic performance of the region	-	12.20	47.32	1.11
competition of greenfields	-	3.34		
reducing aesthetic landscape	-	1.25		
threats to population	-	9.84		
low return on regeneration of brownfield sites	-	3.15		
environmental burdens	-	5.54		
devastated buildings	-	2.47		
non-used territory	-	2.03		
reducing the territorial system of ecological stability	-	7.49		
sustainable use of land in the region	+	1.19		
promoting social development	+	2.25		
increasing employment	+	3.71		
promoting economic development	+	4.53		
increasing environmental quality	+	2.63		
increasing purchasing power	+	4.75		
increasing the average wage in the region	+	4.98		
support for small and medium-sized businesses	+	3.31		
increasing the competitiveness of the region	+	8.92		
tax revenue growth of the municipality	+	8.59		
increasing the quality of life of the population	+	7.83		

Source: Authors

Table 7. Categories of brownfield sites in processes of sustainable development of regions

Category		Scoring
I. category	Very high	Above 1,2
II. category	High	1,19 – 0,9
III. category	Average	0,89 – 0,7
IV. category	Low	0,69 – 0,5
V. category	Very low	0,49 – 0,3
VI. category	Ineffective	0,29 and less

Source: Authors

An effective system of sustainable regional development management with an integral part of the use of brownfield areas should respect all the specifics of the affected region as well as the specific brownfield areas that are determined by their previous uses, including inputs, transformation technologies and outputs. In the so-called system of sustainable development management of the regions, it should also be taken into account the degree of degradation of the productive or non-productive objects, the material composition of structures and other building segments that could affect the total amount of investment needed to restore the brownfield. According to some authors (Khouri et al., 2016; Cehlár et al., 2013; Kováčik, Mariš.2014; Horecký, 2018; Lorincová, 2018), other factors that could directly influence the use of brownfields in the process of development of the regions include their location (urban or rural area), availability of funds (bank loans, EU funds), various forms of support programs by the state and public sector (both monetary and non-monetary). A brownfield management system, defined in such a way, in regional development processes should be characterized by clearly defined rules of monitoring and regular evaluation of predetermined development indicators, accepting principles of sustainable development at the level of the regions, and, of course, adhering to the legislative regulations related to the brownfield regeneration process.

A high level of cooperation and communication has a positive effect on innovation activity (Arndt & Sternberg, 2000; Freel, 2003). In a number of cases, the emergence of cooperative relations is forced. The model of efficient management of the use of brownfield areas in the processes of sustainable development of the regions was designed to respect all external and internal factors affecting the sub-processes of regional development based on the regeneration and subsequent use of brownfields determining the final benefit derived from the comparative synthesis of the results of the evaluation of positive and negative determinants using the integrated scoring ratio as illustrated in the scheme of the brownfield management model in regional development in Fig. 3.

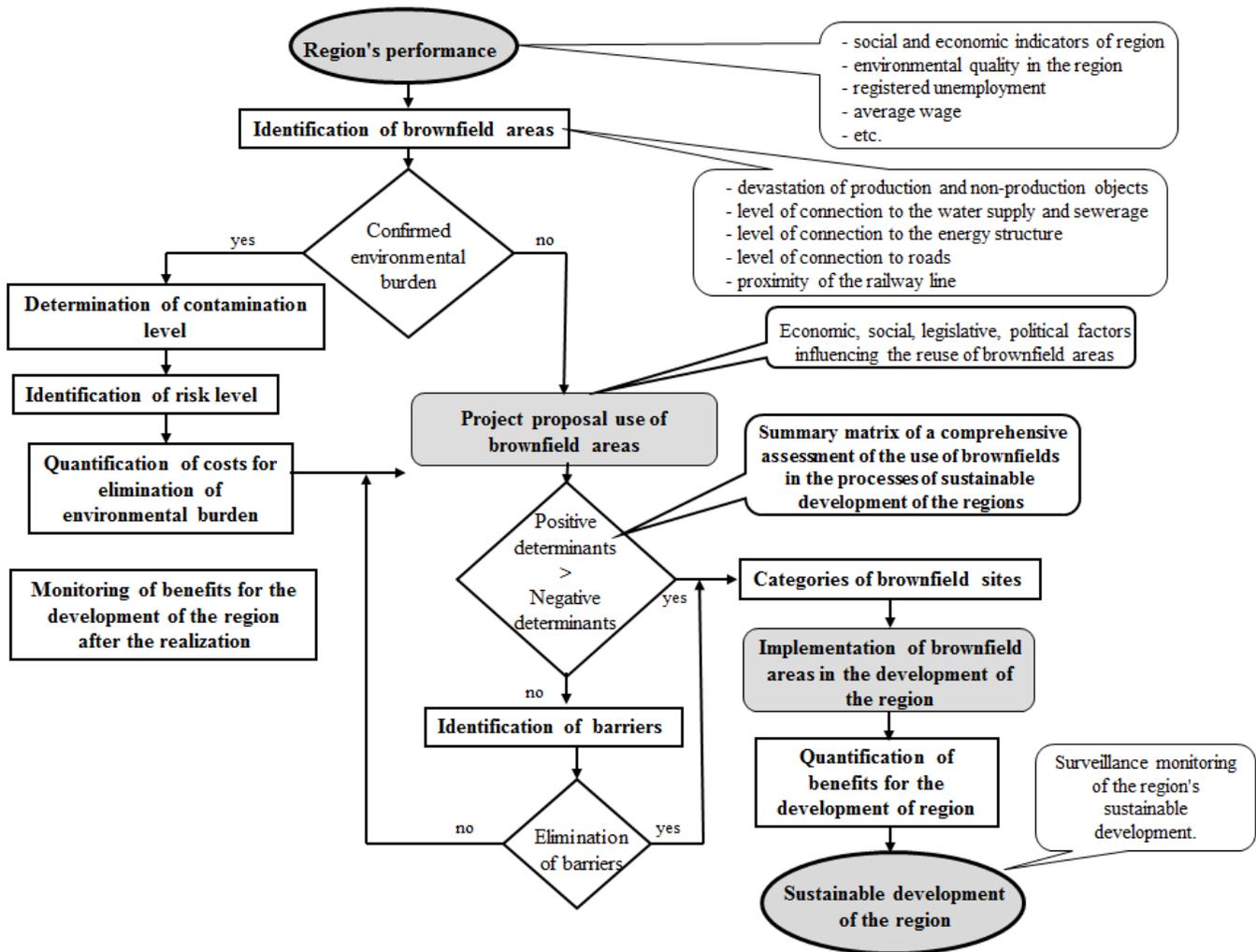


Fig. 3. Model of brownfields management in regional development

Source: Authors

Conclusions

The development in addressing brownfield issues with complicated recovery caused by unclear property rights, lack of information on the kind and extent of contamination determining the economic risks associated with recovery and the resulting additional liabilities. They point to the fact that these areas are not only an isolated problem in the regional development but also a problem whose solving by this strategy could be a reasonable profit to the sustainable development of the regions. The proposed model of the brownfield management system, in terms of sustainable development of the regions with the aim of reducing interregional disparities and increasing the competitiveness of Slovak regions was designed to integrate the following sub-areas of the solution of the analysed problem:

- the current state of brownfield areas, including the identification of its type according to its previous use or predominant use,

- identify the environmental burden and quantify the financial costs associated with its elimination,
- a proposal for the regeneration and subsequent use of brownfield sites according to the needs and specifics of the particular region concerned,
- identifying and evaluating benefits and barriers factors, the pre-defined support category of the region according to the scoring ratio,
- surveillance monitoring of the development indicators of the affected region by using the direction of its development activities to the brownfield potential.

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USING QUANTITATIVE METHODS TO IDENTIFY SECURITY AND UNUSUAL BUSINESS OPERATIONS

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Abstract. Financial institutions are the first vertical level in the fight against money laundering and to improve security. Therefore, it is essential that tools are available to enable effective detection and analysis of suspicious transactions, or unusual business operations. These, in line with the legislative requirements, report to responsible entities - FIUs representing the second vertical plane in the fight against money laundering. However, special software tools are available for obligated persons, especially for financial institutions that carry out tens of millions of financial transactions a day. These can trigger the alert to most unusual operations. The software automatically creates customer profiles, including expected behavior and executed transactions. Using advanced statistical analyses, it identifies unusual business operations, i.e. financial transactions significantly different from those carried out in the past. It is very useful to apply software support in form of electronic detection of indicators of legalization of crime proceeds. However, the output of such support software requires a more detailed and demanding investigation of the nature of operation and is based on the use of special algorithms based on mathematical and statistical methods. The software builds on the results of scientific research.

Keywords: security; unusual business operations; crime; money laundering; corruption; legal acts

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JEL Classifications: E26, E42, G21

1. Introduction

In mid-eighties, computational models based on biological neural networks begin to emerge in scientific contributions aimed at detecting unusual business operations associated with money laundering or terrorism. Mid-nineties are marked by the onset of the theory of fuzzy sets, fuzzy logic, and fuzzy decision making, as well as

spatial statistics and, in particular, data mining. At the end of the last century, genetic algorithms were becoming popular.

Software support specifically designed for financial institutions to identify cases of legalization of proceeds of crime is based on the use of mathematical and statistical methods, especially those dealing with identification of remote values, probability distribution of data - Benford law, correlation and regression, time series, spatial statistics, core component, cluster analysis, decision trees, naive Bayes classifier, graph theory, game theory, fuzzy logic, fuzzy sets, and neural networks.

Data mining can be characterized as data stripping, discovery of knowledge in a database. It is a specific process of gathering new useful information. The process of modeling results in a description of patterns and relationships appearing in the data. It covers existing techniques of data analysis as well as knowledge and information acquisition (Mura et al, 2018; Zulova et al. 2018). The discovery of knowledge in the database is of interdisciplinary character. Data mining uses logistic regression and decision trees. Unlike the classical use of mining data, where the criterion of model quality lies in its accuracy, in case of fraud detection and money laundering, the criterion of quality lies in profitability, or in other words, in the probability of detecting fraud or money laundering (Jančíková, Veselovská 2018; Jančíková, Pásztorová 2018; Grančay et al., 2015; Mura et al. 2017).

2. Theoretical background

Gao, Ye (2007) dealt with using the process of data mining to identify money laundering. The FAIS (Financial Crimes Enforcement Network AI Systems), described by Senator (1995), allows mining data facilities to identify activities potentially related to the legalization of criminal proceeds.

Predictive data mining models suitable for the detection of insurance fraud were published by Hong and Weiss (2001). Bolton, Hand (2002) gave an overview of statistical methods for detecting fraud. Yamanishi et al. (2000) presented SmartSifter, a system identifying outliers, thus suitable for fraud detection, network monitoring, and so on. The system uses data mining. Taniguchi et al (1998) utilized data mining applications for telecommunication subchannels. Gao, Ye (2007) applied data mining techniques to identify transactions potentially related to the legalization of criminal proceeds. The authors compared the results obtained by using data mining with those achieved by traditional investigation methods. Weatherford (2002) and Phua et al. (2005) review the use of data mining in the detection of fraud. Shapiro (2002) gave an overview of the use of neural networks, fuzzy logic and genetic algorithms for fraud detection in insurance. Fu et al. (2012) combined data mining with the chart entropy matrix. They also presented an AML simulation system.

Article of Ngai et al. (2011) reviews and presents a detailed classification system for the use of data mining techniques to detect financial fraud. This document presents the first systematic, identifiable, and comprehensive review of professional literature on data mining techniques used to detect financial frauds. Forty-nine journal articles published from 1997 to 2008 were analyzed. The authors identified four categories of financial fraud (bank fraud, insurance fraud, securities and commodity frauds as well as other financial frauds). They identified six mining data classes (classification, regression, clustering, prediction, outlying values and visualization). The findings of the survey clearly show that data mining techniques have been used extensively to detect insurance fraud. Nevertheless, corporate frauds and credit card frauds have also attracted great attention of the authors in recent years. On the other hand, there is a clear lack of research on mortgage fraud and fraud in money laundering and securities and commodities. The main data mining techniques for detecting financial fraud are logistic models, neural networks, Bayesian networks and decision trees, all of which provide primary solutions to fraudulent data detection and classification problems.

Financial frauds affect millions of people every year and financial institutions must use methods for protecting themselves and their clients. Using statistical methods to address these issues faces many challenges. Financial frauds are rare occurrences leading to extreme imbalances in the data. The volume and complexity of financial data require algorithms that need to be effective. The article of Sudjianto et al. (2010) focuses on two important types of financial crime, namely fraud and money laundering. It describes some of the traditional statistical methods that have been used, as well as the newer neural networks and data mining. The aim of this article is to provide an overview of a wide range of methods accompanied by selected illustrative examples.

In recent years, the number of money laundering offenses has grown through foreign exchange and payment transactions. Cybernetic security issues, which are often perceived as synonymous with the safety of critical infrastructure (eg Dobrovič et al., 2017, Veselovska et al., 2017, Korauš, Kelemen 2018, Šišulák 2017, Limba, Šidlauskas 2018), need to be emphasized.

The Sohn study (2005) proposes four scoring models providing early warnings of money laundering in foreign exchange transactions for incoming and outgoing transfers of funds. Models of logistic regression, decision trees, and neural network are used as well as that combining all three previous models. It appears that the accumulated number of transactions is the most important indicator.

Hawkins (1994) defines an outlier as an observation that deviates so much from other observations as to arouse a suspicion that it was generated by a different mechanism. Frauds of a different nature, including the legalization of proceeds of crime, can be revealed as anomalies in the data. For this reason, outliers may become subject of interest in uncovering unusual operations.

Multiple statistical methods were used to identify outliers (Barnet & Lewis, 1994). We can divide outlier detection methods into two large groups. Methods based on probability distribution and distance-based methods. In the case of money laundering issues, distance-based methods (for example, Euclidean, Manhattan distance) are appropriate. These methods are also used for the detection of outlier in multidimensional cases (Knorr, Ng 1997; Kosinski 1999; Knorr, Ng, Tucakov 2000). An unusual distance is that from the nearest neighbor. The literature lists three types of outlier identified by distance. Outliers are objects, whose average distances to the k th closest neighbors are the largest. This definition was used by Angiulli and Pizzuti (2002). Ramaswamy et al. (2000) have labeled n outlying objects whose distances to the k th closest neighbors are greatest. Knorr, Ng (1999) and Knorr et al. (2000) have labeled outlying objects for which there are fewer than p objects at a distance greater than d . Many outlier detection algorithms that work on small files cannot be used for databases containing tens or hundreds of millions of data. Hung, Cheung (1999), Hand and Blunt (2001) reported an algorithm for the detection of outliers in large databases. The Sherlock system for auditors uses a combination of detection of outliers with classification techniques (Bay et al. 2006). According to Zhu (2006), the detection of outliers is a key element for intelligent financial supervision systems to identify frauds and money laundering by discovering unusual behavior of customers. Detection procedures generally fall into two categories, namely by comparing each transaction against its account history, and then, in order to find out whether its behavior is unusual, by comparing it against the reference set. The paper presents an approach to reduce false positivity.

The Benford's law describes the probability distribution of the first and other significant numbers. It demonstrates that real data sets remarkably contradict the even probability distribution. To come to this conclusion, Benford analyzed 20,229 files from a wide variety of areas. From the statistical point of view, it is the conformity testing (for example, using the Chi-square goodness of fit test) of the empirical distribution of the first and other significant numbers of the studied accounting data with the theoretical division according to Benford's law. The Benford's Law is a simple and effective tool for detecting fraud in accounting (Durtschi et al. 2004). Nigrini (1999) used Benford's law for fraud detection in accounting. He also pointed out the difficulty in generating data that comply with Benford's law. To verify the validity of the Benford's Law, Nigrini and Mittermaier (1997) and

York (2000) have pointed it out as a technique suitable for audits. Not only is the Bernford's law applicable in detection of fraud in accounting, it can also be used for identifying money laundering from financial statements.

3. Research objective

Individual phenomena are always found in certain mutually dependent and determining relationships. The examination of their dependence requires an important step of choosing the appropriate statistical features that characterize given phenomena. The correlation number solves two basic tasks, namely the correlation task, which assesses the tightness of dependence and determines the characteristics describing to what extent the independent variables explain the variability of the dependent variable, and the regression task, which determines the shape of a regression function and estimates its parameters. Regression analysis provides a set of estimates that can predict the effect of certain variables on the variables examined. An important role is played by testing the statistical significance of variables. Nevertheless, caution should be exercised since mechanical testing of statistical significance may conceal actual significance by the size of the studied variable. Statistically significant relationships can be considered negligible if the effect size is too small. Statistical insignificance can occur with many effects that show a high degree of uncertainty. This could cause ignorance of potentially significant money laundering effects. Statistical significance itself is neither a necessary nor sufficient condition for real significance of the observed variable. Logistic regression models are among the generalized linear models. They are used to predict a discrete predictive variable from predictors. Logistic regression allows for identification of variables that significantly affect the affiliation of the object to a group and prediction of this adherence.

Several financial scandals in US corporations caused by accounting fraud have prompted an increase in researchers' interest in their early detection. Charalambos T. Spathis (2002) built a model using logistic regression to identify factors associated with false published financial statements of Greek companies. The accuracy of the correct classification exceeds 84 percent. Bell and Carcello (2000) on a sample of 77 fraudulent statements and 305 statements without fraud designed a logistic regression model to estimate the probability of fraud in the financial statement. On the basis of a set of 130 companies with detected fraud in 1989-2004 and 83 companies without fraud, Jay et al. (2006) have constructed logistic models. Annual averages, shares, percentage changes, and dummy variables entered the models. The likelihood of correct classification by model for the year in which the fraud was committed is 60.0 percent, while for the year before fraud, it is 55.8 percent, and for a year after fraud, it is 61.2 percent. Jay and others (2006) used a regression analysis to elucidate the causes of crime. Regression analysis plays an important role in the macroeconomic approach to measuring the extent of money laundering, especially in quantification based on currency demand, material input-based approach, usually electricity consumption and econometric approach when considering an unobservable variable between certain observable causes and consequences (Walker 1999; Schneider 2007; Straková et al. 2017). Reliable risk assessment method RM/RA CRAMM applicable for a crime risk assessment was described by Mullerova (2016), Mamojka and Mullerova (2017) for multi-purpose use and by Palkova et al.(2018a) for National Risk management system and for disasters (Palkova 2018b) and its legal questions by Mullerova and Mamojka (2017). At the micro level, it is mainly an estimate of the amount of proceeds from the sale of drugs, stolen goods, etc. The range of these activities is usually estimated in a few years and the values between them are approximated.

Cluster analysis is a method that enables to find internal structure in large-scale data sets in the form of so-called clusters. In case of large files, it is a key question to choose a suitable distance and right algorithm. Cluster analysis can also serve as a means for detecting outliers. Data remote from existing clusters can be considered as outliers. For clustering of huge and massive databases, special clustering algorithms need to be used (Williams, Huang 1997, Yamanishi et al. 2000, Zhang et al. 1996). Jiang et al. (2001) presented a two-stage clustering algorithm for outlier detection. The clustering approach suggested by Yang et al. (2014) is tested on bulk data provided by the bank. The result shows that this method can automatically detect suspicious cases of financial

transactions. Rohit and Patel (2015) claim that clustering techniques are the best techniques for detecting non-cyclical operations.

Graph theory represents the discipline of applied mathematics. It is part of network theory. Organizational networks are important from the point of view of the analyzed issue. Special types of networks are often included in artificial intelligence and expert systems applications. Presenting the data in form of charts is useful in several areas. Relationship analysis uses a variety of theoretical techniques of graph theory.

Xu and Chen (2005) dealt with the analysis of visualized various types of criminal organizations. For fraud detection, but also for money laundering, it is important to find anomalies in Ditas which are in graph forms. Based on the entropy method, Shetty and Adibi (2005) identified the most important people in the Enron scandal based on email addresses. The most important are the vertices (in case of Enron, the people), whose omission from the chart results in the greatest entropy change. Noble and Cook (2003) transformed the structural anomalies in the graph to detect anomalous subgraphs. Lin and Chalupsky (2003) defined different metrics to quantify matching edges between the vertices. It is necessary to note that the most important peaks do not necessarily have to be anomalies. Social Network Analysis (Scott, Carrington 2011) is also useful for relationship analysis. It draws attention to the consistency of notaries who enter the notarial records of companies in which the same persons appear. Similarly, the fact that the same doctor confirms multiple injuries in the same person may signal a potential fraud. Network analysis is also useful for identifying a network of people involved in money laundering.

Decision making is the process of selecting one of several variants. The situations in which one of the more variants is to be chosen are the decision situations. A rational participant in this process is one who selects the best option in some ways. An indifferent participant is indifferent to the outcome of the decision. It is a random mechanism that selects variants according to the probability distribution. The situations when the outcome of the decision depends on the participants' decisions are referred to as being conflicting. It is assumed that the outcome of decision-making from the point of view of a rational participant can be evaluated by one (scalar evaluation) or multiple criteria (vector ratings). Game theory deals with decision-making situations with more rational participants with scalar rating. Conflict decision situations with one rational participant and vector valuation are dealt with by the theory of multicriteria optimization. Conflict decision situations with one or more rational participants and one indiscriminate participant with scalar rankings deal with the theory of decision being indefinite. Jones (2004) uses a game theory machine to model the behaviour of managers of companies with fraud. They studied the impact of four factors on the interaction between auditors and managers. The results indicate the relationship between testing, fraud detection and fraud prevention in the company. An audit model involving internal control is analyzed as a non-cooperative game. Matsumara and Tucker (1992) also used the theory of games to detect fraud.

Fuzzy sets and fuzzy logic are a generalization of classical double-valued logic and set theory. Instead of binary assignments, the interval is used for true values $\langle 0, 1 \rangle$. Knowledge and information are linguistically shaped. However, computers need accurate information. Fuzzy sets are useful for translating inaccurate verbal information into numerical information. The linguistic variable is a variable whose values are words or phrases of a natural or artificial language. Fuzzy sets are successfully used to express the content of a linguistic variable. The design of the function of affiliation of the fuzzy set is a fundamental problem. This is possible based on expert knowledge and also by using neural networks. Mastroleo et al. (2001) used a fuzzy expert system for detecting insurance frauds. Estévez et al. (2006) used a combination of fuzzy decisions and a neural network to prevent fraud in telecommunications. The fuzzy set and fuzzy logic apparatus are applied mainly in conjunction with neural networks.

The neural network is a massively parallel processor that has the ability to memorize knowledge gained experimentally and to further exploit this knowledge. The characteristic feature of the neural network lies in its

structure formed by individual neurons linked by synaptic connections. Neural networks can be used successfully in addressing prediction and process management problems, as well as in classifying the objects. Neural networks are able to solve problems that are difficult to solve using classical algorithmic techniques. The neural network does not follow a predetermined algorithm. It is able to learn from examples and use the learned information.

The most common type of neural network is represented by multilayer perceptron (MLP). Another type of neural network used to detect fraud are the self-organizing maps (SOM). Their specificity is given by the fact that under certain conditions it allows a display that retains the typology and displays the characteristic features of the trained set of data. Neural networks are used in all situations where it is necessary to understand complex relationships between variables. Neural networks are non-linear in their design and do not need to explicitly specify the shape of the dependency function. They can also find interactive effects. The acquired knowledge is implicitly stored in the network setup vector. Neural networks based on fuzzy rules allow for improved performance of solutions. Neural networks are usually linked with an expert system into hybrid systems. Another option lies in extracting knowledge from a neural network into an expert system. Genetic algorithms are suitable for setting neural network parameters, difficult optimization problems, and machine learning with classification systems.

Neural networks based on decision trees are used in BAYES, FOIL, RIPPER and other fraud detection systems. The ASPeCT project of the European Commission, Vodaphone and other European telecommunication companies for detecting cell phone fraud also uses neural networks. Neural network technology is also used in the FALCON software suited to detect credit card fraud. Bolton and Hand (2002) gave an overview of neural network applications for detecting legalization of proceeds of crime, credit card fraud, and telecom fraud. The BRUTUS system allows for detecting fraud with mobile phones using neural networks. Ezawa and Norton (1996) also used neural networks to detect fraud based on telecommunication accounts. Stefano and Gisella (2001) developed a fuzzy expert system for the detection of insurance frauds. In order to identify a suspicious transaction and gain information it is possible to use intelligent multi-agent technology (MAT).

Literature brings many debates about the risk and several definitions. There are two interpretations - subjective probability and operationalism (both based on the same source of David Hume's empiricism). In a document on risk definition, Ngai et al. (2011) claims that two ingredients are needed for the risk - the first is the uncertainty of possible experimental results, and the second is that the results are material in nature. Financial institutions and other statutory bodies face two categories of risk: the first is the regulatory risk associated with the violation of rules on combating the legalization of criminal proceeds, and the second business risk (Parkitna et al., 2016) is that a liable entity must face the fact that unknowingly or otherwise, it can be providing services that can be associated with facilitating money laundering or terrorist financing. In addition, it is important to note that regulatory and business risks may overlap.

The risk-based approach is a systematic, continuous process of identifying and measuring the potential risk of money laundering and terrorist financing. At the same time, a strategy to mitigate these risks is emerging and being adapted, especially in the areas mostly at risk. An overview of methods used to detect money laundering based on a risk-based approach is listed by Hong et al. (2015).

4. Patent protection of procedures

Many excellent scientific results from the field of identifying unusual operations and money laundering are rather patented than published in scientific journals. Their publication would make it impossible to have them patented since their disclosure would be classified as a defect in novelty.

In some countries, computer algorithms that serve as bases for enhancing the functionality of computer software may be protected by a patent. In other countries, however, they are explicitly excluded from patentability and considered non-patentable. Software inventions may be patentable provided that the software provides a technical contribution to the state of technology. In most countries, the machine or source code of computer programs may be copyrighted. Although in some countries it is possible, or even necessary, this protection is not dependent on registration. Compared to patent protection, copyright protection is more limited because it only relates to the expression of ideas, not to thoughts themselves. Many companies protect the unit code of computer programs by copyright, while the source code is subject to business secrets.

USA, Canadian and other patent law allows the patenting of algorithms. The following examples are an example of patenting algorithms used to detect unusual business operations and in AML. An example of several patents follows:

Networked system for generating suggestions for exchanging foreign currency for credit in restricted account, has suggestion module for generating suggestion information for transaction locations and transmitting information to user device

Patent Number: US2016140555-A1

Patent Assignee: EBAY INC

Inventor(s): SCIPIONI G.

Computerized method for identifying accounts stored in database of computerized account management system, involves analyzing and assigning all accounts to per-jurisdiction buckets or default bucket, and no account is left unassigned

Patent Number: US2016104166-A1

Patent Assignee: MORGAN STANLEY

Inventor(s): COLE M; CHAN P; ENG K; et al.

RMB crown word number management system, has financial organization center for transmitting data to total center through bank intranet, and self-service equipment arranged on line type teller machine to process paper currency

Patent Number: CN104657818-A

Patent Assignee: SICHUAN JUNYI DIGITAL TECHNOLOGY DEV CO

Inventor(s): GOU J; ZENG L.

System for detecting unusual activity such as money laundering in cash vault transactions, determines dynamic threshold indicating whether change in proportion of large denomination currency transacted by customer is unusual

Patent Number: US2015142629-A1

Patent Assignee: BANK OF AMERICA CORP

Inventor(s): SUPLEE C; HUGHES C B; ZHOU J; et al.

Apparatus for generating graphical user interface for investigating e.g. illegal financial transaction of individual in financial institution, has module for generating interface that displays link to provide correlation between parties

Patent Number: US2015142627-A1

Patent Assignee: BANK OF AMERICA CORP

Inventor(s): LEE A.

Computer-implemented method for removing personally identifiable data, using fraud detection system, involves generating reverse hashing map and which explains how to restore identifiable information of set of hashed data

Patent Number: CA2860179-A1
Patent Assignee: VERA FIN INC
Inventor(s): BURKE A; CHALKER T; KING J; et al.

Laundry treating apparatus for washing laundry at home, has first communication module to receive identity (ID) information and second communication module which communicates with management server through communication network

Patent Number: US2014085046-A1 EP2711453-A1 KR2014038738-A CN103668859-A
Patent Assignee: LG ELECTRONICS INC
Inventor(s): SHIN H; KIM H; PARK M; et al.

Method for anti-money laundering surveillance to detect anomalies related to financial transactions, involves using outlier-shooting algorithm to identify outliers in peer comparison statistical data by generating peer comparison alert

Patent Number: US8544727-B1
Patent Assignee: BANK OF AMERICA CORP
Inventor(s): QUINN M R; SUDJIANTO A; RICHARDS P C; et al.

Method for detecting fraudulent data, involves identifying several reported data types for suspicion of fraud, when series of all digital distributions fails to show supposed theoretical development of digital distributions

Patent Number: US2014006468-A1 US9058285-B2
Patent Assignee: KOSSOVSKY A E
Inventor(s): KOSSOVSKY A E.

Conclusions

On the basis of literature assessment, it can be claimed that the current anti-money laundering research and work policies are primarily focused on the financial sector. Studies also highlight the need to have an international cooperation network, capacity building, enhancement of supervisory processes, and so on. However, in-depth studies of the main weaknesses are also required from a legislative and implementation point of view. It is also necessary to develop typologies and potential security measures using sophisticated mathematical and statistical methods.

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THE ROLE OF GREEN ECONOMY
IN SUSTAINABLE DEVELOPMENT (CASE STUDY: THE EU STATES) *

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Abstract. The analysis of various “green” concepts has historically been linked to a broader discussion of the relationship between sustainable development and the environment. Some authors believe that the solution to the problem of the impact on the planet’s environment is to reduce the level of economic activity, which would mean severe restrictions in the use of resources. Others think that economic activity can continue to grow, but with less impact on the environment; some experts claim that it is quite possible to achieve a balance between economic growth and care for the planet and people. In this context, it is necessary to use a new paradigm that clearly states that “environment” and “economic growth” cannot be seen as conflicting goals, which is confirmed by the authors of the article who studied the situation in the EU countries in the period 2016-2017.

Key terms: sustainable development; Quintuple Helix model; green economy; the EU

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1. Introduction

The idea of sustainable development and environmentally oriented economy which emerged in the second half of the 20th century in the international scientific community, for example, ideas of the Club of Rome, then rapidly spread to all continents. The entire end of the 20th century and the beginning of the 21st century can be represented

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as a series of global forums which polished and refined this paradigm as the only possible, main path for development of the entire planetary system.

Back in the late 1980s and early 1990s, new conceptual approaches to the development of society and economy emerged within the framework of the UN structures, in particular, a new theory that had a huge impact on the discussion of new models: sustainable development. The UN Conference on Sustainable Development (“Rio+20”) held in Rio de Janeiro in June 2012, which was the largest UN conference in the 21st century, actually summarized the outcomes of attempts that had been made for twenty years, to change the traditional type of development to a model of sustainable development. The conference’s greatest achievement was the recognition of the fact that problems of environment and development could not any longer be considered taken separately. The transition to sustainable development implies the preservation of natural ecosystems at a level that ensures the implementation of the needs of present and future generations of people, while maintaining the stability of the ecosystems themselves (the entire ecosphere as a whole). There were five documents adopted at the conference, the most significant ones being “The Rio Declaration on Environment” and “Agenda 21”. In accordance with “Agenda 21”, governments around the world must develop their national strategies for sustainable development – Local Agenda 21 (The World Bank 2012).

Sustainable development in general is a continuous process of satisfying needs of the present and future generations. The definition is unanimously accepted, alas ways of implementation of this approach towards development is under continuous discussion (Tvaronavičienė *et al.* 2015; Strielkowski *et al.* 2016; Tvaronavičienė 2017; Vegeera *et al.* 2018; Stjepanović *et al.* 2017; Razminienė, Tvaronavičienė 2018; Tvaronavičienė 2018; Eddelani *et al.* 2019).

The economic content of sustainable development is a process of managing a set (portfolio) of assets targeted at preserving and expanding the opportunities available to people. Sustainable development implies, first and foremost, changes in three main areas – finance, social responsibility, and ecology, which are interrelated and interdependent (Roshia, Lace 2015; Ohotina *et al.* 2018). At the same time, the concept “sustainable development” is usually considered from two perspectives. In a narrow sense, the attention is mainly focused on its ecological component, but in a broad sense, sustainable development is interpreted as a process that denotes a new type of functioning of the civilization. Therefore, sustainable development is an objective requirement of our time. Balanced development may be considered as part of the concept “sustainable development”; it means a justification for the balance of common priorities (factors) of development (resource, social, economic, environmental, legal, cultural, environmental) in a particular organization and their harmonization with the interests of sectoral, regional and national development. Focusing on the ideas of the process approach, management of sustainable development is a set of techniques, methods, and procedures of the targeted impact that provide a qualitative transformation of the system in the conditions of evolutionary functioning. Sustainable development is a new type of functioning of the production and economic system (society, organization, industry, etc.) that enables to ensure strategic competitiveness over the long term (Kozhevina 2015; Aleksejeva 2016).

The world is now facing the global challenges of a rapidly growing population and the increasing pressure on the environment related to it that should be prevented (Kasztelan 2017). The concept of “green economy” includes ideas of many other approaches in economics and philosophy related to the issues of sustainable development. Supporters of the “green economy” concept believe that the economic system prevailing now is imperfect, although it has produced some considerable results in improving people’s living standards. However, it also resulted in a number of environmental problems (climate change, desertification, loss of biodiversity), depletion of natural capital, large-scale poverty, lack of fresh water, food, energy, inequality of people and countries. The survival and development of humanity requires the transition to “green economy”. This is a system of economic activities related to the production, distribution and consumption of goods and services that lead to the increase in

human well-being in the long term, but at the same time without exposing future generations to significant environmental risks or environmental deficits.

The concept of “green economy” appeared more than 20 years ago (Pearce *et al.* 1989; Barbier 2009). The implementation of the green economy concept was described as a long-term strategy for national economies to overcome the crisis (Barbier 2009), with the objectives of economic recovery; poverty eradication; as well as reducing carbon emissions, and stopping the degradation of ecosystems.

The UNEP (UNEP 2011) considers a “green economy” as the economy that leads to the improvement of human well-being and social justice and which does not have any ecological downsides. At the operational level, the green economy is designed to reduce carbon emissions and pollution; to improve the efficiency of energy and resource usage; and “... it aims to promote economic growth and development while ensuring the use of natural assets for sustainable development” (UNEP 2011) and it supports the progress of social development ... “(International Chamber of Commerce 2012). “...The economy where the growth of the people’s welfare and employment increase are provided owing to the state and social investments ensuring reduction of emissions and environmental pollution and stimulating effective use of energy and resources as well as preventing any harm to biodiversity and ecosystem” (Diyar *et al.* 2014; Stjepanović *et al.* 2017; Smaliukiene, Monni 2019).

The Global Environmental Forum in Nusa Dua recognized the UNEP’s leading role in promoting the green economy concept (Allen, Clouth 2012;) which leads to the improvement of human well-being and social justice, while significantly decreasing ecological risks and deficiencies, at the same time being low-carbon, resource efficient, and socially inclusive (UNEP 2010). Therefore, a green growth corresponding to the green economy concept inevitably leads to sustainable development (Kasztelan 2017, Ohotina 2016). However, it is necessary to continue performing certain tasks for the development of global models and scenarios in order to assess strategies for national “green economy” and “green” growth (Kasztelan 2017).

The aim of this research is to assess the sustainable development in the EU countries, as well as to assess the importance of the green economy factor in the model of sustainable development in the EU countries in the period 2016-2017.

2. Methodology

The only way to solve global problems related to the increasing pressure on the environment is the use of the assets of human knowledge (Carayannis and Campbell 2010; Bhaskar 2010). “The Quintuple Helix” model is one of the models based on the quality management of effective development, restoring balance with nature and preserving Earth’s biological diversity. It can solve existing problems applying knowledge and know-how, as it focuses on the social (public) exchange and transfer of knowledge within the subsystems of a particular state or a national state (Barth 2011a). The innovative model Quintuple Helix explains in what way knowledge, innovations, and environment (natural environment) are interrelated (Carayannis and Campbell 2010; Barth 2011a). The Quintuple Helix model is both interdisciplinary and transdisciplinary: the complexity of the five-spiral framework implies that a full analytical understanding of all spirals requires the continuous involvement of the entire disciplinary spectrum, ranging from Natural Sciences (due to the natural environment) to Social Sciences and Humanities, to promote and visualize the system of collaboration between knowledge, know-how, and innovations for more sustainable development (Carayannis and Campbell, 2010). Therefore, the specific character of the model can be described in the following way (see **Fig.1**).

The *first* subsystem is the system of education where the necessary “human capital” is formed. The *second* subsystem – the economic one – concentrates and focuses the “economic capital” (e.g. entrepreneurship, machines, food, technologies, and money). The *third* subsystem – the political one, i.e. the “political and legal

capital” (e.g. ideas, laws, plans, policies, etc.). The fourth subsystem unites two forms of “capital” – the “social capital” and the “information capital”. The fifth subsystem – the environment is crucial for sustainable development and it provides people with the “natural capital” (e.g. resources, plants, animal diversity, etc.).

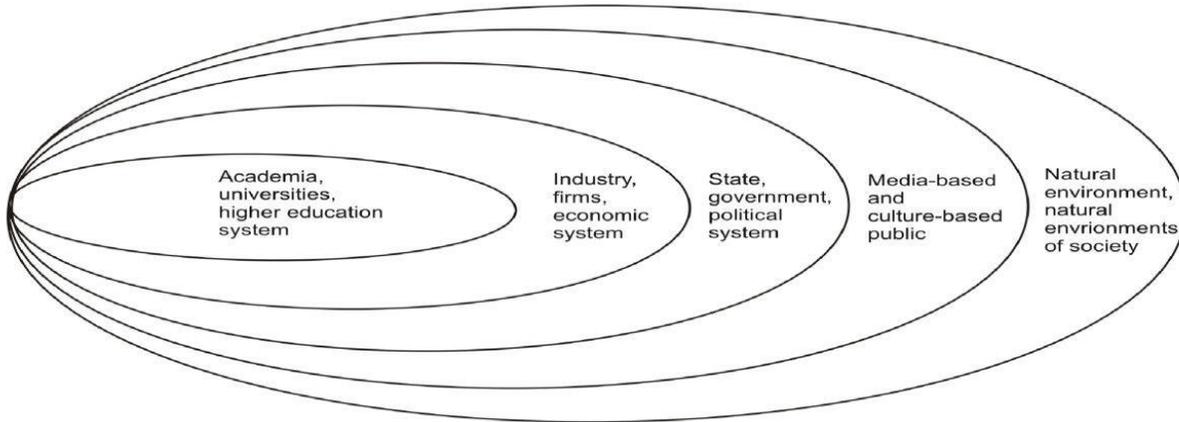


Fig.1. The subsystems of the Quintuple Helix model.

Source: Carayannis et al. 2012; Etzkowitz and Leydesdorff 2000; Carayannis and Campbell, 2009, 2010.

All subsystems in the Quintuple Helix perform functions which influence each other. In the innovative Quintuple Helix model, the natural environment is defined as an opportunity for further development and provision of sustainable development and co-evolution of the knowledge economy, knowledge society and democracy, which also influences the way we perceive and organize entrepreneurship (Etzkowitz and Leydesdorff 2000; Carayannis and Campbell 2006, 2009, 2010; Barth 2011).

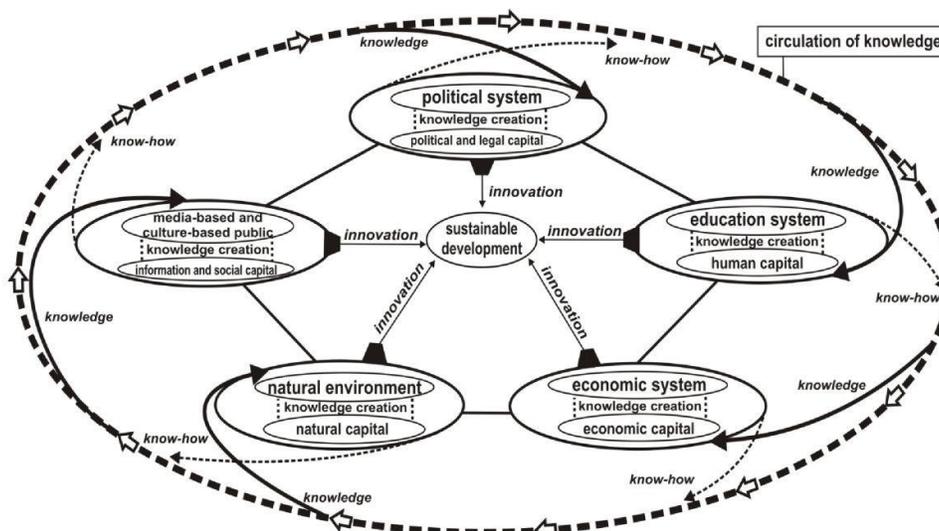


Figure. 2. The Quintuple Helix model and its function (functions).

Source: created by authors by Carayannis et al. 2012

The set of all available statistical and integrated indicators corresponding to the Quintuple Helix model (see Annex 1) in the EU countries for 2016 or 2017 comprised the empirical base of the research. All indicators were standardized, and then, in order to perceive them better, the transition to T scale by the formula $T=50+10*z$ was made. Factors corresponding to the Quintuple Helix model are obtained as arithmetic means of the corresponding indicators; the integrated Quintuple Helix model indicator is obtained as the arithmetic mean of the values of five subsystems. The correlations between the factors are presented in Appendix 2.

3. Research results

Sweden is a leader according to mean values of the five subsystems (60.57). The top six countries also include Denmark and Germany (58.41 and 58.35 respectively), the United Kingdom (57.69), Finland (57.43), and the Netherlands (56.41). Romania (42.90), Poland (43.19), Cyprus (43.54), Bulgaria (43.67), and Hungary (44.34) are at the bottom according to the assessment of the subsystems. The cluster analysis carried out in the obtained five-factor space allowed to group all EU countries into two homogeneous clusters (see Fig. 1). The first cluster (CL+) includes 13 countries which are characterized by higher indicators according to all five subsystems; other 15 countries (CL-) are characterized by a lower level of these indicators. The first cluster (CL+) mainly includes the so-called “old” EU countries: Denmark, Germany, Ireland, Spain, France, Italy, Luxemburg, the Netherlands, Austria, Slovenia, Finland, Sweden, the United Kingdom.

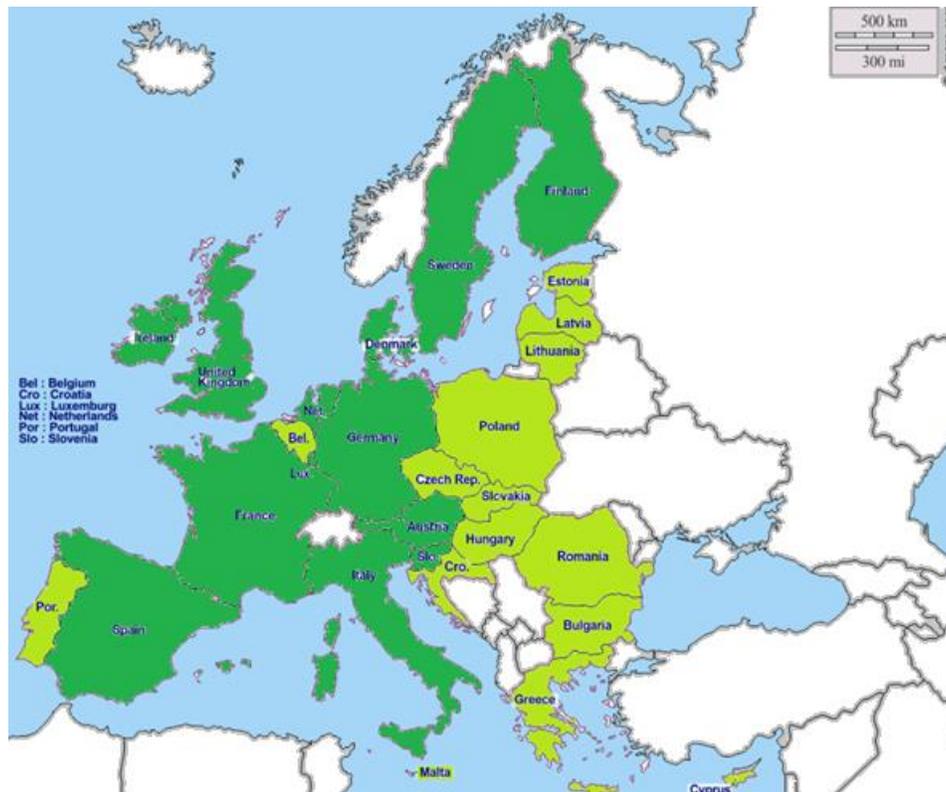


Figure 3. The EU countries included in CL+, CL- clusters of a five-factor space of the Quintuple Helix model’s subsystems in 2016-2017

Source: the authors calculations in SPSS according to statistical data

The second cluster (CL-) mainly includes the countries in Central and Eastern Europe which joined the EU later: Belgium, Bulgaria, Czech Republic, Estonia, Greece, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Portugal.

Considering the mean values of subsystems according to the clusters, it can be concluded that all mean values of subsystems in the CL+ cluster considerably exceed the mean values of subsystems in the CL- cluster: the mean value of the “political” subsystem by 15.4%, the mean value of the “civil society” subsystem 22.6%, the “natural environment” subsystem by 7.8%, the “economic aspects” subsystem by 15.2 %, the “quantify of education system” subsystem by 21.2% (see Fig. 4).

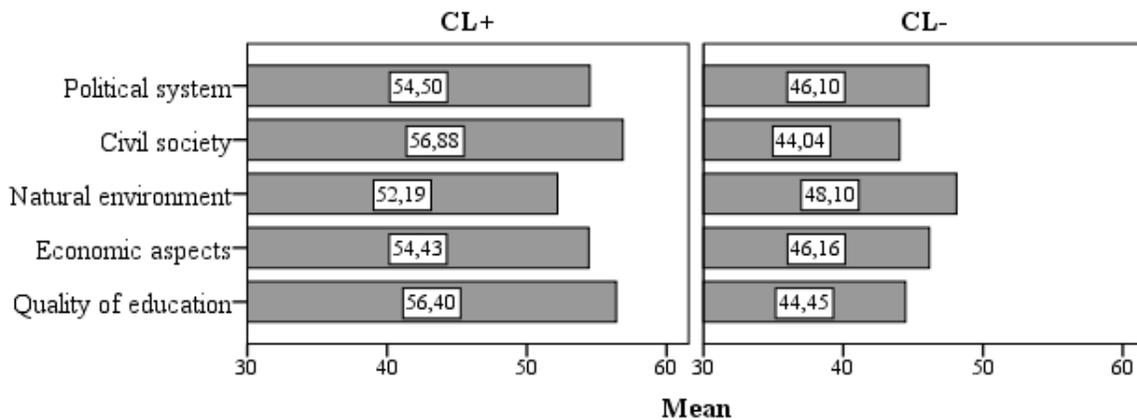


Figure.4. Mean values of the Quintuple Helix model’s systems in 2016-2017 according to the clusters.

Source: the authors’ calculations in SPSS according to statistical data

Sweden is a leader according to the values of the five subsystems in the CL+ cluster, Italy is at the bottom of the list. The United Kingdom is a leader in the “Quantify of education system” subsystem (73.89), Luxemburg is at the bottom of the list(43.59); Sweden is a leader in the “Economic aspects” subsystem (60.54), Slovenia is at the bottom of the list (49.29); Slovenia and Austria are leaders of the “Natural environment” subsystem (56.88 and 56.85 respectively), Ireland is at the bottom of the list (48.35); Sweden is a leader of the “Civil society” subsystem (67.77), Slovenia is at the bottom of the list (45.62); Sweden is a leader in the “Political system” subsystem (63.34), Ireland is at the bottom of the list (47.86) (see Table1).

Table 1. Values of the cluster CL+ Quintuple Helix model’s subsystems in 2016-2017

	Country name	Quantify of education system	Economic aspects	Natural environment	Civil society	Political system	Mean
1	Denmark	56.06	55.24	53.64	66.14	60.95	58.41
2	Germany	66.10	56.43	52.45	62.13	54.66	58.35
3	Ireland	50.94	53.39	48.35	56.75	47.86	51.46
4	Spain	56.71	52.84	48.67	51.73	50.71	52.13
5	France	60.65	52.29	51.75	51.99	55.90	54.52
6	Italy	54.42	53.18	48.73	46.33	48.09	50.15
7	Luxemburg	43.59	54.63	55.12	53.71	50.92	51.59
8	Netherlands	60.93	55.59	49.30	62.12	54.10	56.41

9	Austria	51.90	52.88	56.85	55.58	54.29	54.30
10	Slovenia	45.21	49.29	56.88	45.62	55.13	50.43
11	Finland	55.38	55.04	52.15	63.36	61.20	57.43
12	Sweden	57.41	60.54	53.78	67.77	63.34	60.57
13	United Kingdom	73.89	56.24	50.77	56.24	51.32	57.69
CL5 = CL+							

Source: the authors' calculations in SPSS according to statistical data

Belgium is a leader according to the values of the five subsystems in the CL- cluster, Romania is at the bottom of the list. Belgium is a leader in the “Quantify of education system” subsystem (54.84), Croatia is at the bottom of the list(40.51); Belgium is a leader in the “Economic aspects” subsystem (48.99), Poland is at the bottom of the list (42.94); Croatia is a leader of the “Natural environment” subsystem (52.98), Belgium is at the bottom of the list (43.25); Belgium is a leader of the “Civil society” subsystem (51.47), Bulgaria is at the bottom of the list (36.73); Portugal is a leader in the “Political system” subsystem (53.36), Cyprus is at the bottom of the list (40.11) (see Table 2).

Table 2. Values of the cluster CL- Quintuple Helix model’s subsystems in 2016-2017

	Country name	Quantify of education system	Economic aspects	Natural environment	Civil society	Political system	Mean
1	Belgium	54.84	48.99	43.25	51.47	47.26	49.16
2	Bulgaria	41.85	44.82	50.75	36.73	44.20	43.67
3	Czech Republic	46.48	48.01	48.46	47.76	43.39	46.82
4	Estonia	46.27	46.47	51.46	49.99	50.55	48.95
5	Greece	46.09	45.69	48.70	40.15	48.13	45.75
6	Croatia	40.51	45.27	52.98	37.90	51.49	45.63
7	Cyprus	42.13	45.85	43.58	46.05	40.11	43.54
8	Latvia	41.69	43.86	50.95	45.44	49.82	46.35
9	Lithuania	43.67	44.91	46.74	44.76	46.21	45.26
10	Hungary	42.47	47.73	47.75	38.16	45.60	44.34
11	Malta	44.13	47.17	47.99	46.13	42.83	45.65
12	Poland	46.21	42.94	43.83	39.78	43.21	43.19
13	Portugal	48.35	48.00	45.57	50.01	53.36	49.06
14	Romania	40.79	45.92	47.68	39.36	40.76	42.90
15	Slovakia	41.32	46.78	51.87	46.84	44.59	46.28
CL5 = CL-							

Source: the authors' calculations in SPSS according to statistical data

The assessment of the contribution of each subsystem to the sustainable development model is estimated by calculating the correlation coefficients of the Quintuple Helix model’s subsystems in 2016-2017 with the mean value of all 5 subsystems:

Table 3. The correlation coefficients of the values of the Quintuple Helix model’s subsystems in 2016-2017 with a mean value of all subsystems

	Mean	Mean CL+	Mean CL-
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Quantify of education system	0.315 (p-value 0.000)	0.469 (p-value 0.000)	0.355 (p-value 0.000)
Economic aspects	0.183 (p-value 0.000)	0.166 (p-value 0.000)	0.174 (p-value 0.000)
Natural environment	0.145 (p-value 0.000)	0.196 (p-value 0.000)	0.297 (p-value 0.000)
Civil society	0.310 (p-value 0.000)	0.386 (p-value 0.000)	0.467 (p-value 0.000)
Political system	0.229 (p-value 0.000)	0.269 (p-value 0.000)	0.393 (p-value 0.000)

Source: the authors' calculations in SPSS according to statistical data

Therefore, there is a weak positive linear dependence of the indicator that characterizes sustainable development on the sub-component "Natural environment" in the EU countries. However, in the CL- cluster this dependence is slightly stronger than in the CL+ cluster. The authors found interesting the fact that the sub-component "Civil society" has the most impact on sustainable development in the CL- cluster, whereas the sub-component "Quantify of education system" affects sustainable development the most in the CL+ cluster.

4. Discussion and conclusions

Many researchers made the assessment of "green economy". For example, in the research (Kasztelan 2017) founded on 33 selected indicators of "green economy" on the basis of the OECD methodologies and database, the level of green growth of selected 21 OECD member countries was determined by means of one of the most popular taxonomic methods— the Hellwig's pattern model (Hellwig 1968). The reference years 2010–2014 were chosen due to the data availability. Diagnostic variables defining the level of green growth for particular countries were adjusted in an attempt to meet three criteria: substantive, formal, and statistical. Based on the results obtained, the author concludes that the green growth can provide solutions to economic and environmental problems and create new sources for growth (Kasztelan 2017; Šipilova et al. 2017), however, its level in the OECD countries is still insufficient (Kasztelan 2017). Denmark was awarded the highest score, followed by Germany and Sweden. The United States are characterized by the lowest level of the green growth. Examining 23 EU countries on the basis of 26 indicators in the period 2010-2014 (Kasztelan 2016), A. Kasztelan (Kasztelan 2016) applying the abovementioned methods determined that 5 countries related to Group I – Sweden, Finland, Latvia, Denmark, and Italy - were awarded the highest synthetic score of the green growth level. Group II consisting of 6 states – Estonia, Austria, Lithuania, the Netherlands, Slovenia, and Spain had an outstanding green growth level. Group III which demonstrated the average level of green growth was the most numerous and included Slovakia, Romania, Germany, France, the Czech Republic, Portugal, Hungary, the United Kingdom, Poland, and Belgium. Group IV which is characterized by the lowest green growth level among the countries included only two countries – Bulgaria and Cyprus. In the 2018 research Kasztelan (Kasztelan 2018) analyzing the green growth level in 28 EU countries applying the same methods, determined 4 groups of countries: Sweden (0.6477) is the leader, followed by the countries from the second group Croatia (0.5668), Latvia (0.5447), Austria (0.5399), Finland (0.5383), the Netherlands (0.5249), Slovenia (0.4925), Denmark (0.4874), Hungary (0.4808), Belgium (0.4777), Italy (0.4722), and the United Kingdom (0.4666). Slovakia (0.4647), Lithuania (0.4589), the Czech Republic (0.4570), Luxembourg (0.4538), Germany (0.4521), Portugal (0.4469), Spain (0.4461), Poland (0.4406), France (0.4336), Ireland (0.41 TJ.), Estonia (0.4038), and Romania (0.4015) belong to the third group. The fourth group countries Greece (0.3913), Malta (0.3865), Bulgaria (0.3755), and Cyprus (0.3614) are at the bottom. Therefore, there are both similar trends in the assessment of the green economy presented in this research and other studies, and differences due, in the opinion of the authors, the method of creating the index, the time period, as well as the of the countries under research.

The authors proved the positive role of "green economy" in the sustainable development in the EU countries in the period 2016-2017. "Green economy" as part the concept of sustainable development Quintuple Helix model possesses a significant potential. It is possible to draw similar conclusions analyzing the findings of the research carried out by other authors (Kasztelan 2015).

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Appendix 1

Subsystem 1. In order to quantify the education system of the EU countries we will use such indicators as:

- S_1_1* Quality of higher education and training, index (World Economic Forum 2018);
- S_1_2* Average score of top 3 universities in QS university ranking (The World Bank 2017);
- S_1_3* University industry research cooperation, index (The global innovation index report 2017);
- S_1_4* Total number of documents in Scopus, Environmental science, 2016 (SJR — SCImago 2017);
- S_1_5* Citable documents, 2016 (SJR — SCImago 2017);
- S_1_6* Citations, 2016 (SJR — SCImago 2017);
- S_1_7* Self-citations, 2016 (SJR — SCImago 2017);
- S_1_8* Citations per document, 2016 (SJR — SCImago 2017);
- S_1_9* h-index, 2016 (SJR — SCImago 2017).

Subsystem 2. Economic aspects can be measured by the following indicators:

- S_2_1* Global innovation index (The global innovation index report 2017);
- S_2_2* GDP per unit of energy use (part of GII) (The global innovation index report 2017);
- S_2_3* ISO 14001 environmental certificates per bn PPP\$ GDP (part of GII) (The global innovation index report 2017);
- S_2_4* Resource productivity and domestic material consumption (DMC), PPS per kilogram, 2016 (Eurostat 2018);
- S_2_5* CO₂ intensity (tCO₂) per capita 2017 (World Energy Council 2017);
- S_2_6* Alternative and nuclear energy share (World Energy Council 2017);
- S_2_7* Global green economy index (Global green economy index 2016);
- S_2_8* Markets & Investment, index (part of GGEEI) (Global green economy index 2016);
- S_2_9* Efficiency sectors (part of GGEEI) (Global green economy index 2016).

Subsystem 3. To describe the political system with regard to green innovations the following indicators are used:

- S_5_1* Stringency of environmental regulations, index (Travel and Tourism Competitiveness Report 2017);
- S_5_2* Enforcement of environmental regulations, index (Travel and Tourism Competitiveness Report 2017);
- S_5_3* Environmental treaty ratification, index (part of Travel and Tourism Competitiveness Report 2017);
- S_5_4* Leadership & Climate Change, index (part of Global green economy index 2016);
- S_5_5* Climate Change Performance Index 2018 (Climate Change Performance Index 2018);
- S_5_6* Environmental performance, index (part of Global innovation index) (The global innovation index report 2017);
- S_5_7* Environmental tax revenues % of GDP 2016 (Eurostat 2018)

Subsystem 4. Civil society can be characterized by:

- S_4_1* Global green economy index perception, index (part of Global green economy index) (Global green economy index 2016);
- S_4_2* Press Freedom Index 2017 (Press Freedom Index 2017);
- S_4_3* Democracy index 2017 (The Economist Intelligence Unit 2017)

Subsystem 5. Natural environment and its characteristics:

- S_3_1* Environmental sustainability, index, as part of Travel and Tourism Competitiveness Report (The Travel & Tourism Competitiveness Report 2017);
- S_3_2* Atmosphere pollution, particulate matter diameter equals 2,5 or more (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);
- S_3_3* Baseline water stress, index (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);
- S_3_4* Threatened species, % of total (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);
- S_3_5* Forest cover change, % (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);
- S_3_6* Wastewater treatment, % (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);
- S_3_7* Total protected areas, % of territory (part of TTCR) (The Travel & Tourism Competitiveness Report 2017);

S_3_8 Environment index (as part of Global green economy index) (Global green economy index 2016);

S_3_9 Ecological sustainability, index (as part of Global innovation index) (The global innovation report 2017).

Appendix 2

Pearson Correlation

	Quality of education	Economic aspects	Natural environment	Civil society
Quality of education	1	,793**	,170	,809**
Economic aspects	,793**	1	,453**	,889**
Natural environment	,170	,453*	1	,399*
Civil society	,809**	,889**	,399*	1
Political system	,610**	,663**	,727**	,669**

*Correlation is significant at the 0.05 level (2-tailed).

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AN APPROACH TO DETERMINING CUSTOMER SATISFACTION IN TRADITIONAL SERBIAN RESTAURANTS

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Abstract. The aim of this paper is to make a proposal for an easy-to-use approach to the evaluation of customer satisfaction in restaurants. In order to provide a reliable way to collect respondents' real attitudes, an approach based on the use of smaller number of evaluation criteria and interactive questionnaire created in a spreadsheet file is proposed in this paper, whereby an easy-to-understand and simple-to-use procedure is proposed for determining weights of criteria. In addition to the said, the proposed approach applies the simplified SERVQUAL-based approach, for which reason a simplified version of the Weighted Sum Method based on the decision maker's Preferred Levels of Performances is used for the final ranking of the alternatives. The usability of the proposed approach is considered in the case study intended for the evaluation of traditional restaurants in the city of Zajecar.

Keywords: hospitality, restaurant industry, customer satisfaction, PIPRECIA, WS PLP approach

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1. Introduction

The Serbian word “kafana” originates from the Turkish word “kahvehane”, which means “a place for drinking coffee”. Such places have emerged in the Balkan region under the influence of the Ottoman Empire in the 16th century.

Under the influence of different cultures, kafana generated its specificity on the Balkan Peninsula, so that it also became a place where food was consumed and later a place where alcoholic drinks were served. Over time, kafanas have increasingly become and have found their place in the social and cultural life, as well as in business. Nowadays, kafanas continue to be a place where you meet your friends, a place for celebrations, talking about and discussing things and so on. Therefore, kafanas could be denoted as traditional Serbian restaurants. Compared with the other types of restaurants, kafanas have similarities to taverns and pubs, as places of a pleasant ambience.

Certain new trends in the restaurant and food industry, as well as the growing presence of various cuisines, have had an impact on traditional Serbian restaurants. Fortunately, in some parts of Serbia, traditional Serbian restaurants somehow still resist unfortunately unstoppable trends.

In the city of Zajecar, located in eastern Serbia, traditional restaurants are successfully resisting the actual trends and it is still possible for you to find good restaurants, such as: “Dva brata” (“The Two Brothers”), “Gradska Mehana” (The City Meyhane), “Meda” (“The Bear”), “Roko” (“The Roko”) and so forth.

The factors influencing the satisfaction of restaurants’ customers have been considered in many previous studies. Based on these studies, an approach to the determining of the significance of the relevant factors that influence customer satisfaction is proposed.

The proposed approach also uses the concept of measuring the difference between expectations and perceptions, so it provides an easy identification of the criteria against which customer expectations are not met. Beside all of the above-said, the proposed model can also be used to determine the overall ratings of the considered alternatives, thus making a comparison with competitors.

Based on all of the above-mentioned reasons that have been taken into account, the remaining part of this paper is organized as follows: In Section 2, a review of the relevant research studies is given. After that, in Section 3 and Section 4, the PIPRECIA and the WS PLP methods are considered. In Section 5, an empirical illustration of the evaluation of Serbian traditional restaurants, based on the integrated use of the PIPRECIA and the WS PLP methods, is presented in detail. Finally, the conclusions are given at the end of the paper.

2. Literature Research

Measuring customer satisfaction could be very important in a competitive environment (e.g. Stepaniuk 2018; Raudeliūnienė et al. 2018). For the purpose of determining that, Parasuraman et al. (1988) proposed the Service Quality and Customer Satisfaction (SERVQUAL) model. On the basis of that model, many others more specialized models have been proposed later, such as: WebQual (Loiacono et al. 2002; Parasuraman et al. 2005), eTailQ Wolfinbarger and Gilly (2003), E-RecS-QUAL (Parasuraman et al. 2005), and eTransQual (Bauer et al. 2006).

The SERVQUAL model was used for determining the levels of customer satisfaction in many different areas. As one of these areas, tourism and hospitality can be mentioned. For example: Saleh and Ryan (1991) used

SERVQUAL to determine the gap between clients' and the management's perceptions in the hotel industry, whereas Devi Juwaheer (2004) explore the tourists' perceptions about hotels in Mauritius by using an adapted SQRVQUAL approach. Further, on the basis of the SERVQUAL model, Tribe and Snaith (1998) proposed the HOLSAT model, adapted for determining tourists' satisfaction with their holidays.

Besides, a number of other approaches have also been used to determine customer satisfaction in tourism and hospitality industry, such as: Chaturvedi (2017), Lee and Severt (2017), Engeset and Elvekrok (2015), Albayrak and Caber (2015), Chan et al. (2015), Bernini and Cagnone (2014), Battour et al. (2014).

The SERVQUAL model has also been used in the restaurant industry for determining customer satisfaction. As some examples of these studies, the following can be mentioned: Liu et al. (2017), Kurian and Muzumdar, (2017), Hanks et al. (2017); Bufquin, et al. (2017), Saad Andaleeb and Conway (2006), Heung, et al. (2000), Lee and Hing (1995).

Some other studies have also been dedicated to the restaurant industry. For example: Adam et al. (2015) investigates tourist satisfaction with Ghanaian restaurants based on a factor analysis, and Jung and Yoon (2013) investigate the relationship between employees' satisfaction and customers' satisfaction in a family restaurant.

Dobrovolskienė et al. (2017) state that decision making is crucial to every aspect of business. Multiple-criteria decision-making (MCDM) is a scientific field that has undergone extremely rapid development over the last two decades. Multiple-criteria decision-making considers situations in which the decision-maker must choose one of the alternatives from a set of available alternatives and which are judged on the basis of a number of criteria. This is why MCDM contributes to easier decision-making and adoption of long-term and lasting solutions.

MCDM has also been successfully applied in the hospitality industry. Chou et al. (2008) and Tzeng (2008) used MCDM models for selecting the restaurant location. Yildiz and Yildiz (2015) proposed a model for evaluating customer satisfaction in restaurants, based on the use of the AHP and TOPSIS methods. In their studies: Duarte Alonso et al. (2013), Chi et al. (2013), Kim et al. (2007), Yuksel and Yuksel (2003) and Jack Kivela (1997) investigate the criteria that have an impact on customer preferences and satisfaction.

3. The PIPRECIA Method

The Step-wise Weight Assessment Ratio Analysis (SWARA) method was proposed by Kersulienė et al. (2010). The usability of the SWARA method has been proven in solving many MCDM problems, of which only several are mentioned: Zolfani et al. (2013), Zolfani and Sapauskas (2013), Stanujkic et al. (2017; 2015), Karabasevic et al. (2017), Mardani et al. (2017) and Juodagalviene et al. (2017).

The SWARA method has a certain similarity with the prominent AHP method. The first similarity is that both methods can be used to completely solve MCDM problems or to only determine the weight of the criteria; the second is that both methods are based on the use of pairwise comparisons.

However, the computational procedures of the SWARA and the AHP methods significantly differ from one another. Because of that, the SWARA method has some advantages, as well as some disadvantages, in comparison with the AHP method.

As the main disadvantage of the SWARA method, the fact that its computational procedure does not include a procedure for determining the consistency of pairwise comparisons made can be mentioned. Contrary to that, a significantly lower number of pairwise comparisons required for solving an MCDM problem and for determining criteria weights, too, can be mentioned as an advantage of the SWARA method.

Its requirement that evaluation criteria should be sorted in descending order according to their expected significances, which can prove to be inadequate in some survey cases, can also be mentioned as the weakness of the SWARA method. Therefore, with the aim of extending the use of the SWARA method in the cases where a consensus on the expected significance of the criteria is not easy to reach, Stanujkic et al. (2017) proposed the use of the following equation for the purpose of determining the importance of criteria as follows:

$$s_j = \begin{cases} > 1 & \text{when } C_j \succ C_{j-1} \\ 1 & \text{when } C_j = C_{j-1} \\ < 1 & \text{when } C_j \prec C_{j-1} \end{cases} \quad (1)$$

where: s_j denotes the comparative importance of the criterion j , and $C_j \ominus C_{j-1}$ denotes the significance of the criterion j in relation to the $j-1$ criterion.

In an extension of the SWARA method, proposed under the name of PIPRECIA, Stanujkic et al. (2017) also mention that a lack an integrated procedure for checking the consistency in the ordinary SWARA method can successfully be compensated for by using Kendall's Tau or Spearman's Rank Correlation Coefficient.

Because of all the foregoing, the PIPRECIA method has been chosen to be used in this approach.

3.1. The Computational Procedure of the PIPRECIA Method

The computational procedure of the PIPRECIA method can be shown as follows:

Step 1. Choose the criteria on the basis of which an evaluation of alternatives will be carried out.

Step 2. Set the value of the relative importance of the criteria by using Eq. (1), starting from the second criterion.

Step 3. Calculate the coefficient k_j for the criterion j as follows:

$$k_j = 2 - s_j. \quad (2)$$

Step 4. Calculate the recalculated weight q_j for the criterion j as follows:

$$q_j = \begin{cases} 1 & \text{if } j = 1 \\ \frac{q_{j-1}}{k_j} & \text{when } j > 1 \end{cases} \quad (3)$$

Step 5. Calculate the weights of the criteria as follows:

$$w_j = \frac{q_j}{\sum_{k=1}^n q_k}. \quad (4)$$

where w_j denotes the weight of the criterion j .

4. The WS PLP Approach

Based on the Weighted Sum Method (Churchman and Ackoff, 1954, MacCrimon, 1968), Stanujkic and Zavadskas (2015) proposed the Weighted Sum Preferred Levels of Performances (WS PLP) approach.

The simplified computational procedure of the WS PLP approach for solving an MCDM problem that contains the m alternatives that are evaluated based on the n beneficial criteria (a higher value of the performance rating is desirable) can be shown as follows:

Step 1. Evaluate the alternatives in relation to the selected criteria.

Step 2. Set the preferred performance ratings for each criterion.

Step 3. Calculate the normalized performance ratings of the alternatives as follows:

$$r_{ij} = \frac{x_{ij} - x_{0j}}{x_j^+ - x_j^-}, \quad (5)$$

where: x_{ij} and r_{ij} denote the performance rating and the normalized performance rating of the alternative i in relation to the criterion j , respectively; x_{0j} denotes the preferred performance rating of the criterion j ;

$$x_j^+ = \max_i x_{ij}, \text{ and } x_j^- = \min_i x_{ij}.$$

Step 4. Calculate the overall performance rating of the alternatives as follows:

$$S_i = \sum_{j=1}^n w_j r_{ij}, \quad (6)$$

where S_i denotes the overall performance rating of the alternative i , $S_i \in [-1, 1]$; w_j is the weight of the criterion j .

In the proposed approach, the alternatives whose S_i is greater than or equal to zero make a set of the most appropriate alternatives, out of which one should be selected.

5. A Case Study

In order to determine the preferences of the passionate visitors of Serbian traditional restaurants, a supervised survey has been performed in the city of Zajecar, located in Serbia, near the Romanian and the Bulgarian borders.

In this study, the five previously mentioned restaurants have been evaluated on the basis of the six criteria adopted from Stanujkic et al. (2016):

- C_1 - the interior of the building and the friendly atmosphere,
- C_2 - the helpfulness and friendliness of the staff,
- C_3 - the variety of traditional food and drinks,
- C_4 - the quality and taste of the food and drinks, including the manner of serving,
- C_5 - the appropriate price for the quality of the services provided, and
- C_6 - other.

In the proposed approach the criterion “other” is used to enable personalization.

The survey presented in this study was conducted by e-mail, or more precisely by using an interactive questionnaire created in a spreadsheet file. By using such an approach, the respondents can see the calculated weights of the criteria and can also modify his/her responses if he or she is not satisfied with the obtained results. In addition, by using such an approach, the obtained results can also be presented graphically, which can make easier to understand the procedure used for determining weights of criteria, and thus lead to obtaining more realistic views of the respondents.

The interactive questionnaire was sent to the selected respondents known as the “bohemians” and/or frequent visitors of traditional Serbian restaurants. Out of the approximately 80 sent questionnaires, the 42 of them were returned, out of which only 30 questionnaires were selected as those properly filled in.

The weights of the criteria calculated on the basis of the responses obtained from the two selected respondents are accounted for in Table 1 and Table 2.

Table 1. The weights of the criteria obtained from the first respondent

Criteria		s_j	w_j
C_1	The interior of the building and friendly atmosphere		0.13
C_2	The helpfulness and friendliness of the staff	1.10	0.15
C_3	The variety of traditional food and drinks	1.20	0.19
C_4	The quality and taste of the food and drinks, including the manner of serving	1.05	0.20
C_5	The appropriate price for the quality of the services provided	0.95	0.19
C_6	Other	0.70	0.14

Source: Own calculations

Table 2. The weights of the criteria obtained from the second respondent

Criteria		s_j	w_j
C_1	The interior of the building and friendly atmosphere		0.15
C_2	The helpfulness and friendliness of the staff	1.10	0.17
C_3	The variety of traditional food and drinks	0.90	0.16
C_4	The quality and taste of the food and drinks, including the manner of serving	1.15	0.18
C_5	The appropriate price for the quality of the services provided	0.95	0.17
C_6	Other	0.90	0.16

Source: Own calculations

Some significant descriptive statistical parameters related to the weights of the criteria obtained by the conducted survey are presented in Table 3.

Table 3. The descriptive statistics for the weights of the criteria

Criteria	Min	Max	Range	Mean	Standard Deviation	Variance	Screw	Kurtosis
C_1	0.01	0.17	0.17	0.12	0.05	0.002	-0.84	-0.12
C_2	0.05	0.19	0.15	0.15	0.05	0.002	-0.77	-0.81
C_3	0.03	0.19	0.15	0.14	0.05	0.003	-0.52	-1.13
C_4	0.17	0.37	0.19	0.23	0.06	0.003	0.91	-0.27
C_5	0.17	0.35	0.18	0.22	0.06	0.003	0.76	-0.65
C_6	0.11	0.23	0.12	0.16	0.03	0.001	0.41	-0.77

Source: Own calculations

According to Table 3, the criteria C_4 and C_5 have significantly higher importance related to the other criteria, i.e. the quality and the taste of the food and the appropriate price are identified as the most significant criteria.

The obtained correlation coefficient between the responses obtained from the respondents and the mean ranges between 0.44 and 0.98.

Criterion C_6 - "other" also has a high weight, which can be interpreted as follows:

- in addition to the criteria $C_1 - C_5$ there are other criteria that affect satisfaction of restaurant customers, which can be applied in much more sophisticated models, and
- criterion C_6 can successfully substitute many less significant criteria and such enable forming an efficient MCDM models based on the use of a smaller number of criteria.

In addition to the conducted research, the respondents also evaluated the five preselected traditional restaurants by using the five-point Likert Scale. The results obtained from the two of the above-mentioned respondents are accounted for in Tables 4 and 5.

Table 4. The ratings obtained from the first respondent

Criteria	Alternatives Expected	Meda	Dva brata	MS	Roko	Nasa kafana	S_i	Rank
C_1	3	4	5	3	4	4	0.61	2
C_2	4	5	5	3	3	3	0.85	1
C_3	4	4	5	3	3	4	-0.09	5
C_4	3	5	5	3	4	3	0.20	3
C_5	3	5	4	2	4	4	0.20	4
C_6	2	3	4	3	3	3	0.61	2

Source: Own calculations

Table 5. The ratings obtained from the second respondent

Criteria	Alternatives Expected	Meda	Dva brata	MS	Roko	Nasa kafana	S_i	Rank
C_1	4	4	4	2	2	4	0.32	1
C_2	5	5	4	3	3	4	-0.02	2
C_3	3	4	4	3	3	4	-0.42	4
C_4	5	5	4	4	3	4	-0.51	5
C_5	4	4	4	4	4	3	-0.04	3
C_6	3	4	3	3	3	4	0.32	1

Source: Own calculations

Ranges between the maximum and minimum weights of criteria are also not negligible, as previously shown in Table 3. Therefore, the separate ranking list of considered alternatives has been formed for each respondent, in this approach, by using the WS PLP approach.

In this way, the attitudes of the respondents do not drown into the group attitudes, obtained on the basis of the average weight of and average ratings, and remain clear until the end of the evaluation, where the final ranking of the considered alternative was made based on dominance theory.

The results achieved based on all properly filled questionnaires are shown in Table 6. The appearance of the considered alternative in the first position is given in Column I of Table 6. The appearance of the considered alternatives in the second and the third positions is given in Columns II and III of Table 6.

Table 6. The number of the appearances of the alternatives in different positions

Alternatives	Number of appearances at positions		
	I	II	III
A ₁	15	7	3
A ₂	12	6	6
A ₃	1	1	9
A ₄	4	10	7
A ₅	0	4	5

Source: Own calculations

According to Column I of Table 5, based on the dominance theory, the best-placed alternative is the alternative labelled as A₁.

In this approach, only the appearances on the first position are used for the determination of the best alternative, or more precisely, the most popular traditional restaurant. The appearances in the second, the third, as well as the other positions, could be used for a further analysis.

The overall ratings, obtained by using WS PLP approach, can also be used for various analysis, especially when it is known that WS PLP approach $S_i < 0$ indicates an alternative where expected customers' satisfaction has not been reached yet.

Conclusions

The main objective of this paper is to determine the most significant criteria that have an influence on customers' satisfaction in traditional Serbian restaurants, as well as weights of these criteria, and propose an easy-to-use approach for the evaluation of customers' satisfaction in restaurants.

For that reason, the newly proposed PIPRECIA method, that is an extension of the SWARA method, is proposed for determining the weight of criteria in order to provide an effective and simple-to-use procedure for gathering the attitudes of the examined respondents that will be as realistic as possible.

The gaps between the expected and the achieved satisfaction obtained based on a set of criteria are used to determine the overall performance of any of the considered alternatives, which is done by applying the WS PLP approach. The final ranking of the alternatives is made by referring to dominance theory.

The approach proposed in this paper has significant similarities to the proven SERVQUAL model or models like that one. However, it is based on the use of a significantly smaller number of evaluation criteria, which could allow the forming of the simplest questionnaires that could be more appropriate when preferences and ratings are collected through conducting surveys with ordinary respondents, i.e. those unprepared in advice for surveying.

The usability of the proposed approach has been verified in the case study on the evaluation of traditional Serbian restaurants. The achieved results confirm the efficiency and usability of the proposed approach for solving similar, as well as numerous other, decision-making problems.

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ROLE OF UNEMPLOYMENT INSURANCE IN SUSTAINABLE DEVELOPMENT IN VIETNAM: OVERVIEW AND POLICY IMPLICATION*

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Abstract. Unemployment insurance is one of the social policies that have received much attention from economists in many countries over the past decades. Since 1986, the Vietnamese economy was shifted from the centrally-planned economy to a market one leading to a very fast development of the labor market. Having a young population structure, so the unemployment problem and unemployment insurance policy had considered and recognized as the important social issues in this country. In Vietnam, the unemployment insurance policy is an important part of the Social Insurance Law, promulgated in 2008. Our paper aims to analyze the role of unemployment insurance in Vietnam since this policy officially began in 2009. The Vietnamese government has some targets in the formation of the unemployment insurance fund is the maintenance of regular compulsory contributions of parties to labor relations in combination with public budget supports, focusing on creating a stable financial funding for unemployment insurance regime in the long run. Our regression results using the Ordinary Least Squares (OLS) method and the analysis descriptive statistics show that the unemployment insurance policy has a positive effect on reducing faster and stabilizer the unemployment rate of the Vietnamese economy (this policy have reduced the average unemployment rate by 0.66% per year since 2009). Furthermore, the unemployment insurance policy not only helps the unemployed people stabilize their lives but also provides more opportunities for them to faster continue participating in the labor market by many benefits including free counseling services, free employment placement services, free training services for unemployed people in Vietnam. The success of the unemployment insurance policy has been noted in reducing the number of labor strikes by softening the relationship between employers and their workers in Vietnam. Besides, the unemployment insurance policy will help reduce the fluctuations of the economic cycles automatically by increasing the aggregate demand by multiplier mechanic and contributes to support the economic growth in Vietnam in the period 2008-2010. We can conclude the benefits of unemployment insurance help the development of Vietnamese society towards sustainability in the long run. Finally, the article also suggested some policy implications for the policymakers to have a better control the unemployment as well as stabilize the labor market in Vietnam in the future.

Keywords: unemployment; unemployment insurance; public policy; social policy; social security; labor force; labor market; sustainable development; strike; worker benefit; Vietnam

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1. Introduction

Labor market and unemployment are important issues of economies, which have been received much attention from economists as well as policymakers worldwide. In order to minimize the negative social and economic consequences of unemployment, unemployment insurance is a social security policy chosen by many countries, especially industrial economies. Unemployment insurance policy allows unemployed people to receive a part of their income based on the wages before they lose their jobs (Mankiw, 2009). Besides, the main goal of unemployment insurance is to provide a balance for the expenditure of unemployed workers during the time their job loss (Tatsiramos and Van Ours, 2012).

There were some study results in developed countries showing that unemployment insurance offers many benefits to the economy as well as social development. The unemployment insurance is popularly known as an effective measure in order to assist workers in the market economy. Beside the main role is to providing financial support to stabilize the lives of employees during the period of unemployment time, the other purposes of unemployment insurance are to help the unemployed to quickly find a suitable job by vocational training and job consultant. Mortensen (1977) argued that unemployment insurance would motivate unemployed people to find new employment, as this could continue to ensure their unemployment insurance benefits in the future. According to Hamermesh (1980), unemployment insurance might encourage participation in the labor force because the workers who received a job receive more benefits compared to non-participation. Barron and Mellow (1981) pointed out the positive impact of unemployment insurance funding on job search process of unemployed people. Unemployment insurance can increase labor supply because workers feel better if they stay in their jobs, so unemployment insurance leads to an increase in among employed workers (Yaniv, 1982). Mortensen (1990) also continuously showed that unemployment insurance has a good effect on the job search behavior of the unemployed. However, the larger generous benefits in unemployment insurance will likely result in the higher unemployment rate of the economy, possibly due to the delay in job finding progress when the benefits of insurance may have a substitution of the labor wage (Holmlund, 1998). Besides, Carling et al. (2001) found the impact of unemployment insurance on the transition rate from unemployment to employment in the labor market. Unemployment insurance policy can increase the employment rate and help reduce frictional unemployment as well as the natural rate of unemployment (Mankiw, 2009).

In fact, there are some reasons that make unemployment insurance policy as well as the role of this policy on socio-economic issues, are great interest topics of economists. Because unemployment insurance is not only a good tool for ensuring social security for unemployed people but also an automatic stabilizer of the economy (Holmlund, 1998). According to this regime, when economic growth is slowed down (because of a decrease in the aggregate demand) which can lead to a fast increase in the unemployment rate because the companies lay off the employees. After that, the number of unemployment benefits paid also increased correspondingly. The unemployed people use the subsidy to spend and this money will automatically increase the aggregate demand by multiplier mechanic and contributes to support the economic growth (Mankiw, 2009). Thus, we can conclude that the unemployment insurance policy will help reduce the fluctuations of the economic cycles.

Although many studies have been focused on the unemployment insurance policy in developed countries (Strielkowski et al, 2016; Tvaronavičienė et al., 2018; Volchik et., 2018) however, only a few studies have been conducted in developing countries (possibly due to the fact that many developing countries have not yet applied this policy). However, there is no academic research that analyzes the role of unemployment insurance policy on the economy of Vietnam, one of the fastest developing countries in the world in the past three decades (World Bank, 2017). In Vietnam, the unemployment insurance policy is an important part of the Social Insurance Law signed by the Vietnamese National Assembly in 2006, however, the unemployment insurance regime has only been officially operated since 2009. In fact, unemployment insurance in Vietnam besides provides income

protection (to maintain household's consumption) for those who have lost their jobs during the unemployed time, this policy also has some benefits including free vocational training, free consultant, and job search service. So unemployment insurance is considered one of the core policies to ensure social security for the workers in Vietnam in the long run. However, there is a gap in experimental research focused on the role of unemployment insurance policy in this country. Therefore, our article maybe is the first empirical study that uses and analyze the unemployment insurance data in Vietnam, so we also find some new evidence which bases to suggest some valuable implication policies for the Vietnamese policymakers in the future. Besides, as the fastest growing economy in Southeast Asia, the experiences of implementing the unemployment insurance policy in Vietnam are good references to policymakers in other countries.

Our paper is structured into 4 sections. Besides section 1, which is the introduction, there are 3 additional sections. Section 2 presents an overview of the labor force, unemployment, and the unemployment insurance policy in Vietnam. Section 3 analyzes some of the major effects of unemployment insurance policies on the labor market as well as the social economy. Finally, the conclusions and policy implications are given in Section 4.

2. Overview of unemployment and unemployment insurance policy in Vietnam

Beginning from the group of lowest income countries (in the early 1990s, the GDP per capita in Vietnam was stuck at a very low level, between \$200 and \$300), the Vietnamese government tried to strongly change this situation by an economic revolution which was named 'Doi Moi' in Vietnam during the three decades by now. Besides, this Asian country did a series of economic and political reforms and steered its economy to becoming a "socialist-oriented market economy". With many success results were achieved, today, Viet Nam is considered as one of the stars of the emerging markets universe. In particular, since 2009, Vietnam's economy was ranked in a group of emerging markets worldwide by the Economist Intelligence Unit (EIU). This group is named 'CIVETS' which has six economies including Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa. This group is expected to become a new motivation for the world economic growth in the next decades (McGregor, 2011). According to the statistics from the General Statistics Office of Vietnam (GSO, 2018), Vietnamese economy stays in the "golden population structure" period because the number of people in its labor force is nearly two times compared the people outside. In 2016, Vietnam has 54.44 million people aged 15 and over in the labor force, accounting for more than 58.73% of the total population (92.69 million people). Of these, male laborers are 28.07 million (calculated as 51.6% of the labor force) and female laborers are 26.37 million workers (accounting for 48.4% of the labor force). Thus, the young structure of the population and abundant labor force are the strengths of Vietnam in economic development. The labor resource is also a strong point to attract a huge among foreign direct investment to Vietnam's economy with more than \$ 320 billion and 25,524 projects in the total number.

However, the young population structure also creates pressure on Vietnam's economy in the target to create more and more new jobs for the new employees. When the economic growth is slowed down that will lead to decrease the number of new jobs, so the "golden population structure" advantage is immediately shifted to the risks coming from increasing underemployed as well as rising unemployment and causing social instability. Facing a rapidly growing population - the total number maybe reaches at 95 million people in 2018, half of whom are under 35, and up from 60 million people in 1986 and is expected to expand to 120 million before tailing off around 2050. Besides, there is an emerging middle class—currently accounting for 13% of the population, but expected to reach 26% by 2026 (World Bank, 2018). So Vietnam has spent large public investments in every education levels as well as invested a lot in its human capital and training infrastructure. The leaders of the country believe that this is very necessary, it will help the sustainable development because a growing population also means a growing need for jobs (Vanham, 2018).

Table 1. The main statistical indicators about economic system of Vietnam (2017)

No	The national indicator	Statistical number
1	Area (1000 km ²)	330,9
2	Population (Million)	92.69
3	Labor force (Million)	54.44
4	Average GDP per capita (USD)	2385
5	Average FDI per capita (USD)	386
6	Average Investment per capita (USD)	806
7	Economic growth (%)	6.81
8	Inflation, CPI (%)	2.6
9	Unemployment in urban (%)	3.1
10	Trade Openness	2.1

Source: The author calculates from the General Statistics Office (GSO, 2018)

In 1987, Vietnam created its first law on foreign investment, starting to enable foreign companies to enter the domestic market. Besides, the Vietnamese government's drive towards an open economy also included domestic reforms with public corporations as well as private companies (Vanham, 2018). With the economic innovation promoted in Vietnam over the past three decades, besides the state economic sector, the Vietnamese government has re-developed the private business sector as well as made a strong strategy to attract more and more foreign direct investment from worldwide. The positive results of the economic renovation can be seen in the rapidly increasing in the national output as well as the sharply decreasing in the unemployment rate in Viet Nam during the period (World Bank, 2017). The statistics showed the unemployment rate was quite high as about 13% of the Vietnamese labor force in 1989 (the beginning period of the economic innovation), however, the unemployment rate was calculated only as 3% of the labor force in 2017 (GSO, 2018).

The high growth rate in the population by nearly 2.3% per year in the period 1980-1990 had added a large number of labors to the national labor force year by year, placing pressure on the Vietnam labor market in the next periods. In this period, unemployment had always been in a stress situation, with the number of people losing job was more than 12.7% of the Vietnamese labor force. In the 1990-2000 period, the unemployment rate continues fell but remained relatively high compared to other developing countries, for example in 1996 the unemployment rate of Vietnam's economy was about 6% which was significantly lower than its average unemployment rate for the previous decade. In order to faster reducing the unemployment rate in a sustainable manner as well as to implement social security for the unemployed people, the unemployment insurance policy for job losers has been popularly discussed in Vietnam in the period of 2005-2007. After that, Vietnam issued a national unemployment insurance policy in 2008 and officially implemented this policy in 2009 (specifically, the Social Insurance Law was passed by the National Assembly on June 29, 2006, in which, the provisions on unemployment insurance regime officially had been taken effect from January 01, 2009). To operate the contents of the Social Insurance Law, the Vietnamese government signed the unemployment insurance document with the Decree No 127 (2008) and continuously adjusted this policy by a number of its decrees in the next time. Besides, the Ministry of labor-Invalids and Social Affairs (MOLISA) has also issued a number of guidelines for implementing the unemployment insurance policy in Vietnam. The unemployment insurance policy is really a new breakthrough policy in the labor market, which aimed to help the unemployed stabilize their lives, would ease the heavy load on the national budget and companies from this social issue.

Table 2. The main documents for implementation of unemployment insurance policy

Publication	Department	Year of approval	The main content
Social Insurance Law	National Assembly	2006	Regulations on unemployment insurance policy
Decree No. 127	Government	2008	Guiding the implementation of the unemployment insurance regime
Circular No. 04	The Ministry of Labor, Invalids and Social Affairs	2009	Guiding the implementation of the unemployment insurance regime
Decree No. 100	Government	2012	Guiding the implementation of the unemployment insurance regime
Decision No. 55	Government	2013	Determining the level of vocational training support for unemployed people
Employment Law	National Assembly	2013	Additional provisions on unemployment insurance and the framework for public management of employment.
Decree No. 28	Government	2013	Guiding the implementation of the unemployment insurance regime
Circular No. 28	The Ministry of Labor -Invalids and Social Affairs	2015	Guiding the implementation of the unemployment insurance regime
Decision No. 959	Government	2015	Guiding the implementation of the unemployment insurance regime
Decision No. 828	The Ministry of Labor-Invalids and Social Affairs	2016	Guiding the implementation of the unemployment insurance regime
Resolution No. 44	Government	2017	Reduce the unemployment insurance contributions extracting from the employees' wage

Source: The author collects from Vietnam's Government database

According to the Government's Decree 127 (2008) and the Employment Law (2013), the financial benefit of the unemployed people is the monthly payment equal to 60% of the average monthly wage and based on the average salary paid for the six months preceding the time of unemployment. Unemployment allowance duration is calculated based on the month of unemployment insurance premium of the employee. The minimum received duration is 3 allowance months and the maximum received duration is 12 allowance months. In the detail, if an unemployed labor has contributed the unemployment funding in the period including full 12 months to 36 months, he would be entitled to 3 months unemployment allowance as the total number. When his contributed month number increase 12 months, the allowance duration would add one month for the allowance period but the maximum level does not exceed 12 months. However, an employee who have paid unemployment insurance premiums for more than 36 months, the unpaid months (not full 12 months) for unemployment benefits are reserved as a basis for calculating the period of unemployment benefits for the next unemployment benefit period when he qualifies for unemployment benefits as regulated points of the unemployment policy.

Besides, the unemployed people are who have lost their jobs or terminated their labor contracts according to the provisions of labor legislation or terminated their working contracts according to the labor law provisions of Vietnam. The unemployment insurance policy aims to: (i) provide unemployment benefits to unemployed people (see Table 3), (ii) provide free training for the unemployed people and (iii) free support to rapidly find new jobs. Therefore, since January 2009, a worker losing his job has been entitled to the benefits based on the unemployment insurance policy. The revenue of the unemployment insurance fund was contributed as 3% of total employment wage, in which, 1% by the employers, 1% by the workers and 1% from the national budget.

However, the rate for the employer was downed from 1% to 0.5% based on the government's Resolution No. 44 (since June 1, 2017).

Table 3. The Unemployment insurance benefit in Vietnam

The running time of benefits	Unemployment insurance participation period	The value of monthly unemployment allowance
3 months (minimum level)	from full 12 months to 36 months	As 60% of the average monthly wage of six consecutive months before unemployment
4-6 months	from exceeding 36 months to 72 months	
7-11 months	from exceeding 72 months to 132 months	
12 months (maximum level)	from exceeding 132 months	

Source: The author collects from Vietnam's Government database

Since 2009 (the unemployment insurance regime was run at the first time), the unemployment rate has been sharply fallen which indicating that unemployment insurance policy has made positive contributions to reducing the number of unemployed people by many ways including expenditure allowances in the unemployment time, vocational training, and job search service. According to the statistics of the General Statistics Office of Vietnam (GSO, 2018), the annual unemployment rate sharply decreased from 4.65% in 2008 to 3.18% in 2017 (because the lack on the database in Vietnam, so in this study, we are only using the statistic values in urban areas instead of the unemployment rate of Vietnam).

Comparing before and after the operation time of the unemployment insurance policy, we can see a difference in the unemployment trend of the Vietnamese economy. The average unemployment rate in the period 1998-2008 was about 5.74% per year, then in the period 2009-2017 the rate of unemployment was only 3.61% per year. Thus, we see a breaking point in the unemployment rate trend after the unemployment insurance policy was started in Vietnam (see Figure 1). In addition, the continued drop in the unemployment rate along with the increase in the labor force has made this success more prominent. Figure 1 shows that job creation and unemployment reduction policies have been extremely successful over the past 10 years in Vietnam.

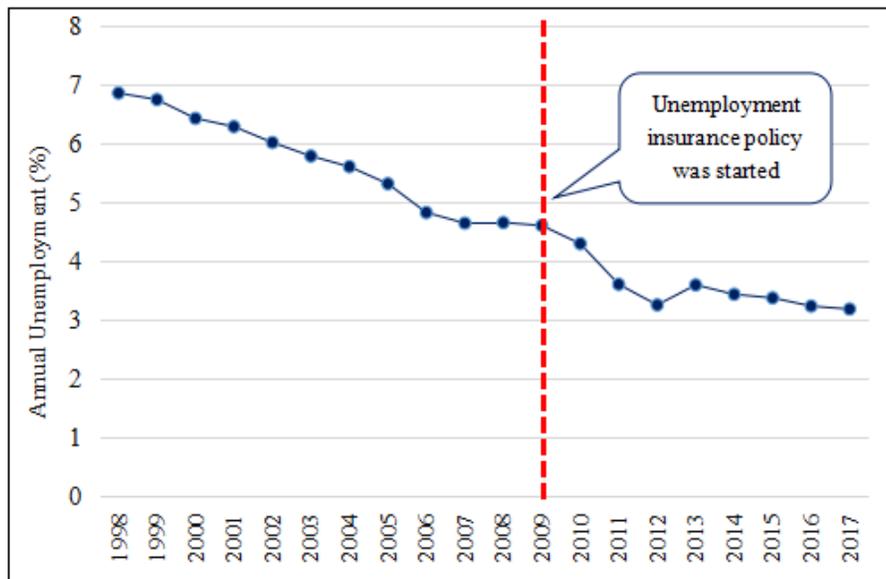


Fig.1. The unemployment rate in the period 1998-2017

Source: The author calculates from the research data (GSO, 2018)

It should be noted that Vietnam's unemployment rate tends to be sideways for three years, 2007-2009, suggesting that despite the World economic crisis (2008) had negative impacts on the economy which result in a decrease in the growth rate (in particular, the economic growth rate has fallen from 8.5% in 2007 to 5.32% in 2009). Implying that the operation of the unemployment insurance policy has helped Vietnam's unemployment rate not increase in the same period when there was a strong decline of the gross output. Besides, during the crisis period, we can see the aggregate demand of the economy was slowed down which led to a surplus situation in the supply of products and result in many companies were bankrupt in this period. However, the unemployment insurance had contributed as an automatic stabilization tool of the Vietnamese economy. According to this mechanism, when we see a decrease in the aggregate demand which can lead to a fast increase in the unemployment rate because many companies lay off their workers. So the allowance money and a number of unemployment benefits paid also increased correspondingly the rising of unemployment. After that, the unemployed workers use the subsidy to expenditure and the money flows will automatically increase the aggregate demand by multiplier mechanic and contributes to support the economic growth. In the case of Vietnam's economy, the economic growth was restored very rapidly from the 5.32% in 2009 to 6.78% in 2010 as an evidence from the automatic stabilization role of the unemployment insurance on the economy. The evidence in the Vietnamese economy is also a good note that the unemployment insurance maybe encourages participation in the labor force because the workers who received a job receive more benefits compared to non-participation (see Hamermesh, 1980) or the unemployment insurance policy can raise the labor supply as well as among employed workers because they would feel better if they stay in the jobs (see Yaniv, 1982).

For a more in-depth analysis of the impact of unemployment insurance policy on the unemployment issue in Vietnam, the quantitative regression will be used with the unemployment data of the economy. In the detail, we estimate a function which calculates the relationship between the unemployment rate (the dependent variable) and two independent variables including the time trend and the dummy variable denoted the impact of unemployment insurance policy. The annual data is used for the period of 1992-2017 with 26 observations. The estimated function is presented in the following equation:

$$\text{Unemployment}_t = \beta_1 + \beta_2 \text{Time}_t + \beta_3 \text{UIP}_t + \varepsilon_t \quad (1)$$

In which, Unemployment variable is the unemployment rate in the period, Time variable is denoted as the trend time in the study period and UIP is the dummy variable which measures the impact of the unemployment insurance policy on the unemployment rate of the Vietnamese economy. Finally, the error term is represented by ε and t denotes time periods, with $t \in [1, 26]$.

The unemployment insurance variable is defined in the bellowing form:

$$\begin{cases} \text{UIP} = 0 & \text{with the year} < 2009 \\ \text{UIP} = 1 & \text{with the year} \geq 2009 \end{cases}$$

The unemployment function (1) will be estimated by the Ordinary least squares (OLS) method. In addition, the Chow-Breakpoint test (Chow, 1960) for time-series is used to identify the impact of the unemployment insurance policy on the unemployment rate. The breaking time is choosing the year of 2009 for the testing method (this year in which the policy was begun). According to the Chow (1960) testing method, we will have a test of whether the true coefficients in two linear regressions on different data sets of the unemployment rate equation are equal. Based on the unemployment function (1), the data is split into two groups (first group and second group), then we have two different functions in the below paragraphs,

$$\text{Unemployment}_t = \lambda_1 + \pi_1 \text{Time}_t + \gamma_1 \text{UIP}_t + \varepsilon_t \tag{2}$$

$$\text{Unemployment}_t = \lambda_2 + \pi_2 \text{Time}_t + \gamma_2 \text{UIP}_t + \varepsilon_t \tag{3}$$

The null hypothesis of the Chow test assumes that $\lambda_1 = \lambda_2$, $\pi_1 = \pi_2$, and $\gamma_1 = \gamma_2$, and we have an assumption that the errors are independent as well as a normal distribution with unknown variance. We denote S_C is the Sum of squared residuals from the combined data, S_1 is the Sum of squared residuals from the first group, and S_2 is the Sum of squared residuals from the second group. Besides, N_1 and N_2 are the numbers of observations in each group and the total number of parameters is k . The statistic of the Chow test is calculated as the following equation:

$$\text{Chow_stat} = \frac{[S_C - (S_1 + S_2)]/k}{(S_1 + S_2)/(N_1 + N_2 - 2k)} \tag{4}$$

After that, the Chow test’s statistic follows the F distribution with the degrees of freedom are included k and $N_1 + N_2 - 2k$. The results of OLS’s estimation and Chow-Breakpoint test are presented in the table below.

Table 4. Estimation results of Unemployment function

Dependent variable: Unemployment rate			
Variable	Coefficient	Std. error	t-statistic
Constant	7.121335***	0.185623	38.36458
Time	-0.129103***	0.017818	-7.245655
UIP	-0.665523**	0.280896	-2.369283
R-Squared	0.9215		
F-statistic	135.0399 [0.0000]		
Chow Breakpoint test (Year = 2009) = 2.835086* [0.0803]			

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%;

Source: The author calculates from the research data.

The regression result shows some findings in line with the unemployment trend of the Vietnamese economy. The result points that the unemployment rate decreased by an average of 0.12% per year over the study period (1992-2017) at the statistical significance of 1% level. The negative sign (-0.66) of the coefficient of the dummy variable at the statistically significant of 5% level implies the unemployment insurance policy has had a significant effect on the unemployment rate. In which, the unemployment insurance policy has reduced the average unemployment rate by 0.66% per year since 2009. The Chow-Breakpoint test has a value as 2.835086 at the 10% significance level also confirms that there is a breakout in the trend of the unemployment rate at the year of 2009 (this is another evidence about the impact of the unemployment insurance policy on the unemployment rate in Vietnam). In conclusion, the results of the regression, as well as the Chow-Breakpoint test, confirm that the unemployment insurance policy has significantly reduced the unemployment rate in Vietnam during the study period.

There is not only the role of the unemployment insurance policy in stabilizing the labor market but also the impacts of other macroeconomic policies. In fact, the beginning and operation of the unemployment insurance policy in Vietnam coincided with the World economic crisis booming in 2008 and spreading to the developing countries, including Vietnam (World Bank, 2010). Therefore, during this period, the Vietnamese government also issued many strong policies in order to support the business community. According to the Government’s Decision No. 131 (2009), the monetary policy was expanded quickly which focused in reduce the interest rate by 4% for the enterprises for 8 months with the total amount of assistance funding from the national budget about \$ 1 billion for the supporting program. The Government also operated four solutions that were urgently implemented,

including: (i) reduce the income tax (by 30%) or postpone income tax (for 9 months) for businesses, (ii) reduce as 50% of the value-added tax for 19 groups of products and services, (iii) increase the public expenditures for the poverty people and social well-being, and (iv) financial support for vulnerable people in the society (Hung, 2009). These supporting policies had positive impacts in the short run as they helped support both aggregate supply and aggregate demand thereby reducing the number of bankrupts companies due to the negative impact of the World economic crisis.

However, these support policies were also criticized by some economists that tax cuts (both direct and indirect taxes) could lead to budget deficit as well as increased tax pressures in the next fiscal years (Bikas et al. 2017). Besides, a strong raising in public expenditures also simultaneously increased the deficit level. In the context that the Vietnamese government has been facing large fiscal deficits for many years so these solutions could have a harmful effect on economic growth (Tung, 2018). In addition, the mutant credit flowings into the economy also brought high inflationary rates in the period 2010-2012, after that, the high inflation could have a negative impact on economic growth in Vietnam (Tung and Thanh, 2015) or might lead to a instability in macroeconomics (Korauš et al. 2017).

On the other hand, most of the short-term support policies (eg, the allowance policy in the interest rate) have ended by the end of 2011 as well as the foreign investment inflows also sharply slowed down as the result of the world economic crisis, while the unemployment rate in Vietnam has steadily declined in a long-term trend over time (see Figure 1). Thus, it can be concluded that although there are positive effects from other macro policies, the unemployment insurance policy has had an important positive impact on the unemployment as well as the labor market in Vietnam in the long run.

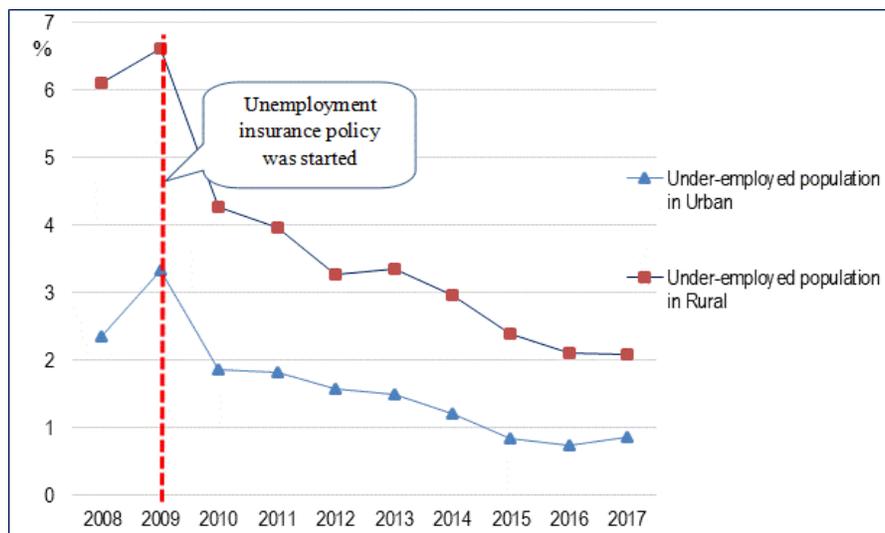


Fig.2. Under-employed rate in the period 2008-2017

Source: The author calculates from the research data (GSO, 2018)

The statistics from the General Statistics Office of Vietnam continue to show that under-employed rate also declined sharply in the period 2008-2017. The decline in the average rate of under-employed labor occurred in both urban and rural areas (see Figure 2). Based on the concept of General Statistics Office of Vietnam that the under-employed population include persons who have jobs that in the reference period (7 days prior to the survey time point) satisfied all three following criteria: Firstly, willing to work additional hours: (i) wants to work

overtime (some) work to increase time; (ii) wants to replace one of the jobs being done by another one to be able to work overtime; (iii) to increase the hours of one of the existing jobs; (iv) or a combination of the above three types. Secondly, available to work additional hours, which means that in the future (for example a week), if there are job opportunities they are willing to work overtime immediately. Thirdly, the fact they had worked less than a threshold relating all work completed during the reference week. Like other countries that are implementing of 40 hours worked per week, “time threshold” to determine the under-employment status in Vietnam is “less than 35 hours worked during the reference week” (GSO, 2018).

In particular, the under-employed rate in the urban area fell from 3.33% in 2009 to 0.85% in 2017. In the same period, in the rural area, the under-employed rate has also fallen from 6.61% in 2009 to 2.07% in 2017. The decline of the under-employed rate in both urban and rural region is a clear demonstration of the success of public policies on labor field and in the connection role between labor supply and labor demand (in which, there is a very important role of the unemployment insurance policy). Based on the statistics, we can see the good impact of the unemployment insurance regime by promoting employment security for workers as well as flexibility for businesses community. The unemployment insurance program played an important role through the training subsidies for the unemployed workers as the way to assist the unemployed workers to rejoin the labor market as soon as possible. The declining trend of the under-employed rate in the study period indicates a positive impact of unemployment insurance funding on job search process of unemployed people. The unemployees have more motivation to return the labor supply because they can receive many benefits when they stay in the jobs so the under-employed rate, as well as the unemployment rate, can be sharply decreased in the labor market (see Barron and Mellow, 1981; Yaniv, 1982; Mortensen, 1990; Carling et al., 2001).

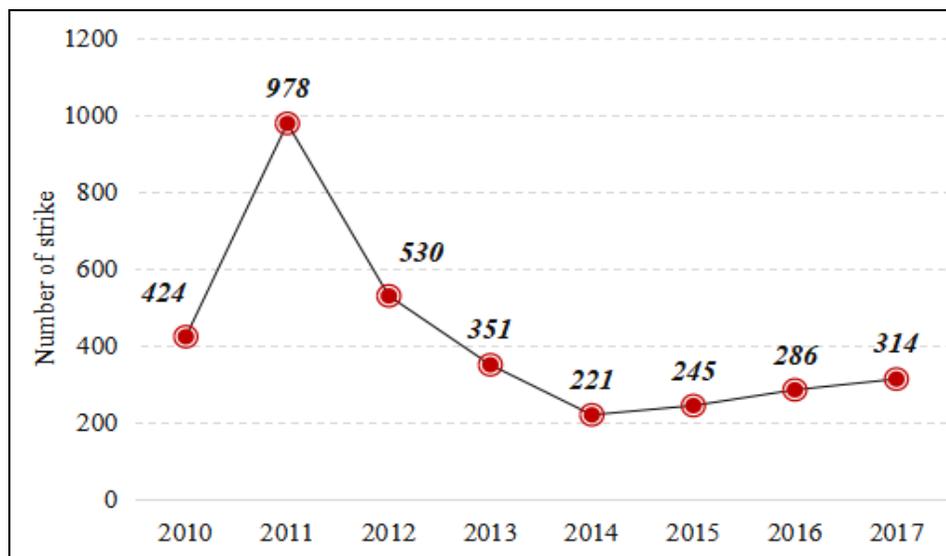


Fig.3. The number of strike in Vietnam, 2010-2017

Source: The author collects from the Ministry of Labor-Invalids and Social Affairs

The unemployment insurance policy also contributes to soften the conflicting relationship between employers and employees in Vietnam. Another positive performance of the unemployment insurance policy is reflected by the number of labor strikes tending to decrease sharply in the period 2010-2017. From a record high with 978 strikes in 2011, the number of the strikes fell strongly to 221 in 2014. Although the number of strikes has risen to 314 by 2017, however, this fact could be explained by the number of companies as well as the number of

employees in the labor force also strongly increased in the same period. Thus, the reduction of the strike's number is also an evidence that the unemployment insurance policy has contributed to smoothing and warming the relationship between employers and workers in Vietnam. For employers, when the unemployment insurance regime is operated, they do not have to spend large amounts of money to pay severance packages and pensions for laborers who lose their jobs (Diem, 2010). The financial burdens of companies will be shared, especially in the periods of economic crisis when their production scales down and many employees are laid off at the same time.

3. The achievements in the performance of the unemployment insurance policy

During the period 2009-2017, the unemployment insurance policy has been supported by many opinion sides in Vietnam, from the business community and the workers as well as policymakers in the government. The statistical reports of the General Statistics Office of Vietnam show that the unemployment insurance policy has achieved many good achievements in many aspects of the socio-economic in Vietnam. These achievements can be substantiated based on the figures below.

3.1. The increase of unemployment insurance budget

The unemployment insurance policy was implemented in Vietnam, which is a major change in social security regime involving the working relationships in this economy. The operation of unemployment insurance offers some benefits to employee and society, this policy also increases the labor costs for the businesses (because the companies have to pay 1% of their salary fund) as well as reducing the income of employees (the workers must pay 0.5% of the received salary). However, since 2009, the number of employees participating in the unemployment insurance regime has increased rapidly over the years, with an average increase of 7.9% per year. These statistics show the correctness and suitability of the policy to the worker community in Vietnam.

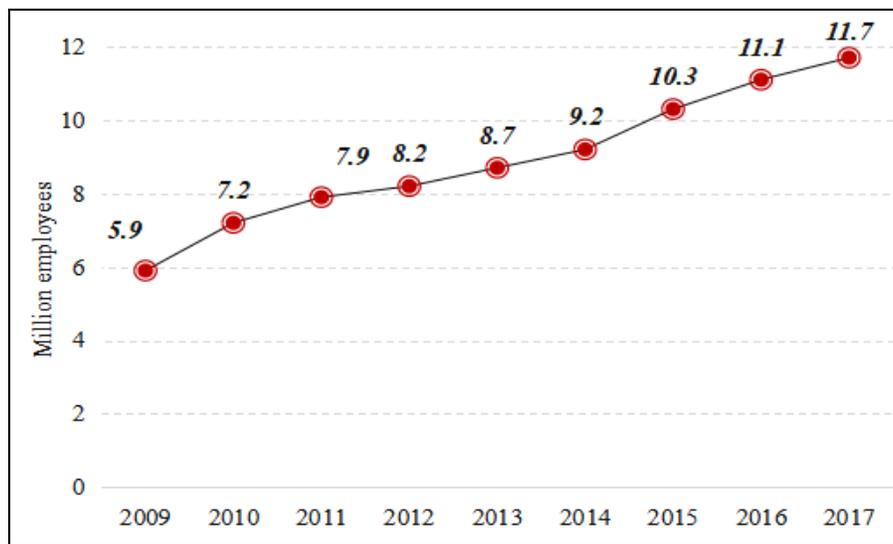


Fig.4. Number of insured employees on employment insurance system in 2009-2017

Source: The author calculates from the research data (GSO, 2018)

Specifically, there was a significant increase from 5.9 million employees joining the regime at 2009 (the first operation year) to 8.2 million in 2012 and reach to 11.7 million participants in 2017 (an increase of 1.9 times compared to 2009). The average increase rate of employee numbers joining the unemployment insurance regime

was 7.9% per year in the period of 2010-2017. As the coming result, the increase in the number of participants has led to the total revenue of the unemployment insurance budget has also increased rapidly over the years which has created a solid foundation for the performance of the policy in the long run. In this section, we will discuss more detail about the revenue, expenditure and budget status of the insurance fund. If the total revenue of the fund was only VND 5740 billion in 2010, then reached VND 12734 billion in 2013 (up about 2.2 times). The revenue from unemployment insurance fund declined slightly in the period 2014-2016 because many businesses were bankruptcy in the same period. However, the unemployment insurance fund's revenue increased sharply to VND 17368 billion in 2017 (approximately 3.02 times comparing in 2010). Since June 2017, the Vietnamese government has agreed to cut a half of the contribution of unemployment insurance by employers to 0.5 percent of their salary fund for raising the competitiveness of the business community. On the other hand, the Vietnamese government also stopped its contribution to the unemployment insurance fund because of its current huge surplus, so the employers and the employees are the only contributors in the future.

The unemployment insurance expenditure for unemployed people, job search service as well as job training service which were increasing in the period 2010-2017. The fund spending has an average risen of around 17.8% per year during this period. The fund spent only VND 539 billion in 2010, then by 2014 has increased to 4820 billion and in 2017 the expenditure on the unemployment insurance fund reached 8330 billion. The spending was speeding-up over time has shown that unemployment insurance offers many benefits for the unemployed people on some aspects such as unemployment benefits, vocational training, and job placement. Although spending has increased, however, revenues have always been higher than fund expenditures (see Figure 4), creating a budget surplus for the fund, sustainability of the activity, and security for management in the field of labor and unemployment insurance regime in Vietnam in the coming time.

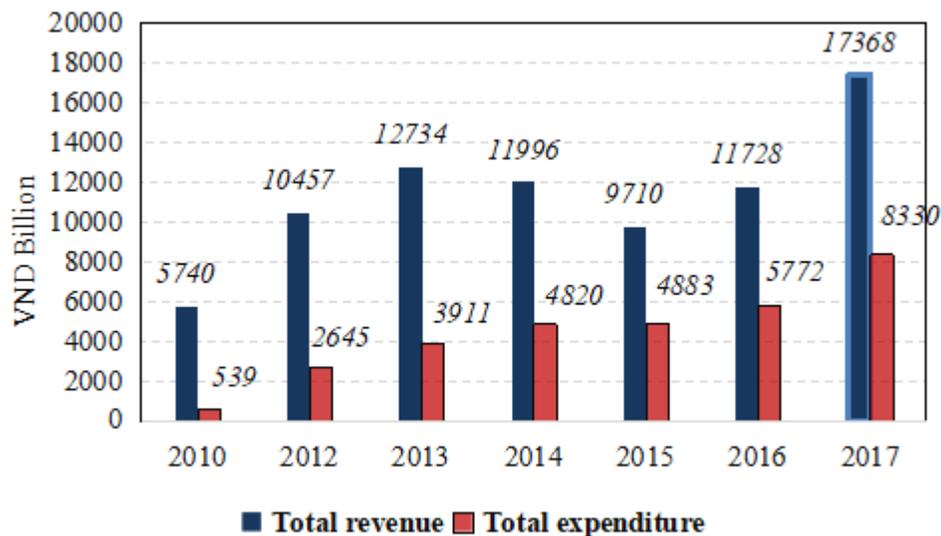


Fig.5. Revenue and Expenditure of employment insurance system in 2010-2017

Source: The author calculates from the research data (GSO, 2018)

According to data of the General Statistics Office of Vietnam on the budget balance between the revenue and the expenditure, the unemployment insurance fund has an accumulated surplus of about VND 67 trillion at the end of 2017 (this surplus might be included the interest of fund at 10% per year in Vietnam) and would be forecasted to continuously increase in the coming time. In the detail, the budget had a surplus of VND 8870 billion and this

number has risen to VND 44454 billion in 2014 and reached a cumulative VND 67320 billion at the end of the fiscal year 2017. The value of budget surplus increased steadily throughout 2009 -2017 provides the long-term sustainability of the unemployment insurance fund (GSO, 2018).

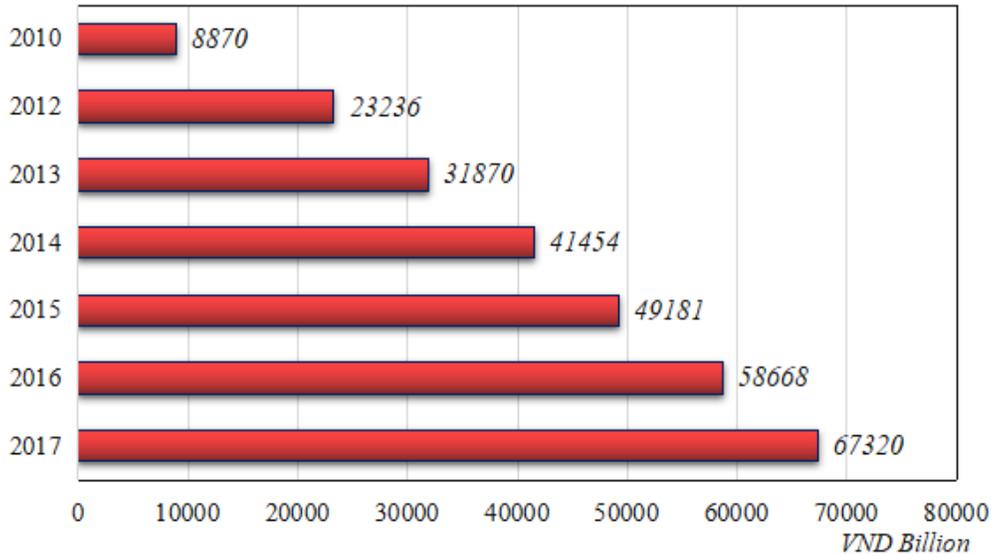


Fig.6. Accumulated surplus value of employment insurance budget in 2010-2017

Source: The author calculates from the research data (GSO, 2018)

However, the supervisors of the unemployment insurance fund have reported an increase in bad debt in the contribution money of the companies due to difficult business conditions or corporate bankruptcy. In addition, many companies have stopped operating, or have used the insurance money to invest in their business which causing risks to sustain of the unemployment insurance fund in the future. In addition, the managers of the fund expect the applying of information technology for unemployment insurance regime will reduce the cost of unemployment insurance management system in the coming time.

3.2. *The number of employees is entitled to unemployment benefits*

Since the starting time to now, the unemployment insurance policy has an important role in the ensuring social protection which is always regarded as a regular mission of the Vietnamese government as well as the whole society. In the period of 2009-2013, the unemployment insurance is not only a good tool for ensuring social security for unemployed people but also an automatic stabilizer mechanic of the Vietnamese economy to successfully passing the world economic crisis period. When the economic growth rate was slowed down from 8.05% per year in the period of 2003-2007 to 5.9% per year in the period of 2008-2012, which put a sharp rise in the unemployment rate because many companies cut off the employees in order to against the bankruptcy risks. Thus, the number of unemployment benefits paid also increased immediately and also automatically raise the aggregate demand by multiplier mechanic and contributes to support the businesses as well as the growth rate (see Holmlund, 1998; Mankiw, 2009). The unemployment insurance policy has achieved great success not only in supporting unemployed people stable their life but also contribute to ensuring social security in Vietnam. The payments and services provided within the scope of unemployment insurance are the unemployed allowances, illness insurance, finding a new job and vocational training. Some main achievements of unemployment insurance policy in Vietnam can be collected in the following table.

Table 5. Number of employees receiving benefits from unemployment insurance

Content	Unit	2014	2015	2016	2017
Number of the unemployed people were entitled to the policy benefits	Thousand people	517.5	545	586.2	619.6
Number of the unemployed people received the job placement advice	Thousand times	125.7	132.3	144.6	159.1
Number of the unemployed people were supported by the vocational training program	Thousand people	45.6	59.6	68.5	74.7

Source: The author collects from the Ministry of Labor-Invalids and Social Affairs

In the overall, during the period 2010-2017, the unemployment insurance system has covered nearly 3.5 million people received unemployment benefits. In addition, the statistics were collected only in the period 2014-2017 showed that there were 2.2 million people were entitled to unemployment insurance benefits, 248 thousand unemployed people were retrained as well as 561.7 thousand of the new jobs were introduced during the time. The rapid increase in the number of people receiving unemployment benefits over the years has shown the role of ensuring the social security of the policy in the context that the Vietnamese economy has been facing many difficulties in the development during this period. However, on the other side, there are some social opinions indicate that unemployment insurance benefits can be hard to apply because many Vietnamese employed people are still working in the informal labor regime (In which, the enterprise do not have any official contract with the labor in order to avoid with the unemployment insurance regulations).

Conclusion and policy implication

This article aims to analyze the role of unemployment insurance policy in Vietnam in the period 2009-2017. Our investigated study shows that this policy has had a positive impact on the labor market operation in the Vietnamese economy. In particular, the unemployment insurance regime has helped to reduce the unemployment rate during the operation period. The quantitative result using the Ordinary Least Squares (OLS) method estimates that the unemployment insurance policy has a positive effect on reducing faster and stabilizer the unemployment rate of the Vietnamese economy. In detail, the policy has reduced the average unemployment rate by 0.66% per year since 2009. The policy also provides many benefits to unemployed workers through unemployment benefits, vocational training as well as job search service. Besides, the unemployment insurance policy has played an active role in reducing the number of strikes in Vietnam by softening the relationship between employers and their workers in the productive period.

The executing documents related to the unemployment insurance policy also need to be simpler in order to facilitate the registration of unemployment benefits as well as increase the transparency of information relating to benefits for the unemployment employees. In the coming time, the policymakers in Vietnam need to continue to promote the implementation of the unemployment insurance policy covering the business community. Strengthening the inspection and monitoring of the policy implementation at enterprises in order to continuously increase the number of participants in unemployment insurance in the coming time. Given the growing cumulative surplus of the unemployment insurance fund, it is advisable to cut the level of contribution rate as well as increased unemployment benefits to a higher level. Another urgent solution is that the government need to continue the application of information technology, automate the unemployment insurance management system to cut costs for the system in the coming time. In the future, the government need to have a reduction of the level of pay for unemployment insurance fund of employers, besides, it is also necessary to adjust the level of

contribution to the unemployment insurance fund from the workers to ensure the average equality with both sides in the labor market. Besides, the policymakers need to have a database about the number of employees in the informal sector in the economy as well as the strong solution towards the employers in executing the unemployment insurance policy. Because the informal employees are the weak objects in the labor market as well as the society, who are missed every benefit from the policy. Although having many different opinions, finally, our paper also emphasizes that the unemployment insurance policy will continuously have an important role in supporting sustainable development in Vietnam in the future.

However, there are some limitations which are still living in our paper. Although the main aspects reflect the role of the unemployment insurance policy in Vietnam has been tried to deeply analyze, however, our article is having some limitations in quantifying the effects of other macroeconomic policies on unemployment rate or the impact of the foreign investment inflows on the unemployment status in the same period. These limitations of our article are also matters for continuous analysis in subsequent studies in Vietnam in the future.

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SOCIAL ENTERPRISES: EVALUATION OF THE IMPACT OF STATE SUPPORT AND CORPORATE INCOME EXEMPTIONS ON THE STATE BUDGET OF LITHUANIA

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Abstract. The increasing interest in social enterprises is related to the specifics of their business activities, which not only involve the most vulnerable part of the society, but also offer greater opportunities for the socialisation of the disadvantaged. As a rule, social enterprises may be entitled to some tax exemptions or may apply for the specific state support. Such tools help to reduce the low efficiency of social enterprises and extend possibilities for the most vulnerable part of the society to participate in the creation of the general economic value of enterprises and the country as a whole. The recent changes introduced in Lithuania reduced the level of the state support and the exemptions from corporate income tax for social enterprises under the impact of the opinion that such enterprises may misuse the status of social enterprises and, accordingly, the state support tools. Therefore, such changes raise the need to evaluate their possible influence on the state budget of Lithuania. The purpose of the research is to evaluate the impact of state support and corporate income exemptions for social enterprises, on the state budget of Lithuania. The object of the research – involves the data of income statements of social enterprises, the information on state support, the state budget of Lithuania for the period of 2013 – 2017. The research deployed the legislation analysis, the inductive and deductive methods, the methods of systematisation, comparison and summary of information. The research results show that the value of corporate income tax exemptions and state support do not have a significant impact on the state budget of Lithuania and reach around the average of 0.18% of the state budget. Nevertheless, the reduction of state support and corporate income tax exemptions may limit the possibilities of social enterprises to reinvest their profits, expand businesses and employ marginalised population.

Keywords: social enterprises; state support; corporate income tax exemptions; Lithuania

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JEL Classifications: M10, D20

1. Introduction

The interest in social enterprises is consistent with the increasing demand imposed on business organisations to trigger positive social changes by engaging in social and environmental initiatives. However, traditional business organisations keep social value creation at the periphery of their operations and engage in social projects to protect and complement the core objective of wealth generation. Differently, in social enterprises, social value creation is central to their operations because these ventures employ a market-based organisational form with the purpose of creating positive changes in the society, thus being at the intersection between the traditional “business” and “charity” model (Ramus, Vaccaro, 2017). This model emphasises several most important aspects of social enterprises: the involvement of the most vulnerable part of the society in business activities and greater socialisation of this part of the society. Thus, the role and importance of social enterprises in the economic and social systems of any country should be most significant. According to their importance, social enterprises usually have some tax exemptions or may apply for the specific state support. These tools not only help to reduce the low efficiency of social enterprises, but also offer possibilities for the most vulnerable part of the society to participate in the creation of the general economic value of the enterprises and the country as a whole. The latest political discussions observed in Lithuania have initiated several governmental decisions leading to the reduction of the level of state support and the exemptions from the corporate income tax to social enterprises under the assumption that such enterprises may misuse the status of social enterprises and, accordingly, the state support tools. Therefore, these changes raise the need to evaluate their possible influence on the state budget.

The purpose of this research is to evaluate the impact of state support and corporate income exemptions provided for social enterprises on the state budget of Lithuania. The object of the research is the– data of income statements of social enterprises, information on the state support, the state budget of Lithuania over the period from 2013 through 2017. The research deployed the legislation analysis, the inductive and deductive methods, the methods of systematisation, comparison and summary of information.

2. The research methodology

Figure 1 presents the methodology of the research carried out in several phases to evaluate the impact of the state support and corporate income tax exemptions, provided for social enterprises, on the state budget of Lithuania. The first phase involved the examination of the concept of social enterprises based on the analysis of the opinions and research findings obtained by the Lithuanian and foreign scientists. The second and third phases included the analysis and evaluation of the Lithuanian condition of social enterprises, the state support and corporate income tax exemptions provided for social enterprises.

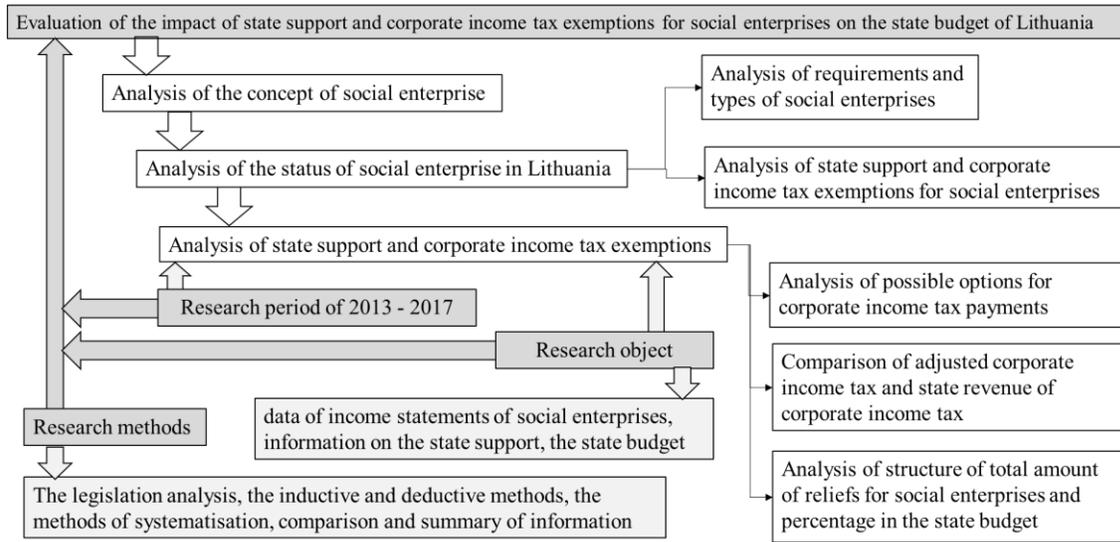


Fig. 1. The research methodology
 Source: composed by authors

The evaluation of the impact of state support and corporate income tax exemptions for social enterprises on the state budget of Lithuania was carried out on the basis of the analysis of income statements of social enterprises, the information obtained from of the Lithuanian Labour Exchange on different types of state support provided for social enterprises and the information on the state budget of Lithuania for the period of the last five years. The total amount of social enterprises in 2017 was 189 (The Lithuanian Labour Exchange, 2018). In order to meet the target of the research, the selection criterion of possessing the status of a social enterprise over the entire research period was set. In all, 99 social enterprises complied with the criteria and were selected for the research. The income statements of the selected enterprises for the period of 2013–2017 were provided by the Credit Bureau “Creditinfo”.

3. The concept of a social enterprise

Social enterprises are vital legal entities in the economy of any country. These enterprises involve the disabled persons and other most vulnerable persons of the society not only in terms of the creation of the general economic value of the country, but also play a crucial role in the participation of the individuals in the social life and the activities of communities. These aspects emphasize the need to analyse the concept of social enterprises and the impact of their activity.

Social enterprises may be of different legal forms, but should meet several criteria to have the status of a social enterprise. In general, according to A. Szymanska, M. Jegers (2016, p. 502), there are three generic forms of organisations: governments, profit organisations and non-profit organisations. A social enterprise is one of the possible hybrid forms. The EMES (International Research Network) claims that social enterprises should satisfy the following criteria: they operate continuously, have a high autonomy, have a considerable level of risk, and employ a minimum number of paid workers (Szymanska, Jegers, 2016, p. 502).

M. P. Miles, M.-L. Verreynne and B. Luke (2014) argue that social enterprises are organisations with an overarching core social mission funded through market-based initiatives. They exist to serve their beneficiaries and are increasingly being relied upon to provide essential social services as government services decline. The authors call social enterprises as hybrid organisations established for a social purpose, using a for-profit business

model to generate the financial resources needed to support their social missions. As unmet social needs become more critical, social enterprises are seeking to become more efficient and effective in their operations and strategies to fulfil their missions (Miles, Verreynne, Luke, 2014).

B. Gidron, Y. Monnickendam-Givon (2017, p. 128) provide a simple definition of social enterprises; it is most commonly described (in different variations) as an organisation that pursues a social mission through the use of market mechanisms. The authors also state, that social enterprises are organisations—companies—that aim to provide social services but they can accomplish this task only if they can ensure their financial viability to operate. They think that the concept of ‘social enterprise’ is not new and has been presented and discussed in the literature for a long time, mostly in the context of the developing countries. By and large it pertains to entities that combine commercial and social objectives. (Gidron, Monnickendam-Givon, 2017, p. 127).

V. Pestoff and L. Hulga (2015, p. 1752) state that despite more than a decade of intensive discussion, a precise definition of social enterprises at the EU level does not exist yet. According to EMES, a social enterprise’s economic project comprises a continuous production of a good or service, based on some paid work, and it takes an economic risk (Pestoff, Hulga, 2015, p. 1752). The authors conclude that much of the American academic debate about social enterprises fails to take into account the political or governance dimensions at the center of the collective efforts of the EMES network of European scholars to promote a better understanding of social enterprises. The EMES network has extensively discussed and developed nine ideal types of criteria for defining and delimiting social enterprises - three economic, three political and three social criteria (Pestoff, Hulga, 2015, p. 1754). Three indicators reflect the economic and entrepreneurial dimensions of social enterprises: a) a continuous activity producing goods and/or selling services; b) a significant level of economic risk; c) a minimum amount of paid work. Three indicators encapsulate the social dimensions of such enterprises: a) an explicit aim to benefit the community; b) an initiative launched by a group of citizens or civil society organisations; c) a limited profit distribution. Three indicators reflect the participatory governance of such enterprises: a) a high degree of autonomy; b) a decision-making power not based on capital ownership, c) a participatory nature which involves various parties affected by the activity (Social enterprise, 2018).

B. Gidron and Y. Monnickendam-Givon (2017, p. 128) also refer to the EMES network and state that this network has engaged in studying the concept of social enterprises for the past two decades and has developed an ‘ideal-type’ approach to define the concept. Their definition is composed of three components: (i) the economic and entrepreneurial dimensions, which, practically, suggest that the entity engages in commercial activities of selling a product or a service and competing in the market; (ii) the social dimensions, which have to do with the contribution to the community – the *raison d’être* of the entity; and (iii) the participatory governance dimensions, which provide an expression of community ownership (Gidron, Monnickendam-Givon, 2017, p. 128). The authors conclude, based on the results of their research, that in recent years a growing number of market-oriented social enterprises have been formed in the world of social welfare. Many of these provide employment for marginalised populations, mostly people with disabilities, where the participants are treated as workers, receive a regular salary and enjoy the same benefits as other workers (the social goal). These entities produce a product or provide a service that is sold and competes on the market (the business strategy). Obviously, the product or the service produced or provided fits the specific abilities of the employed population, which calls for an enterprise that is created around those abilities, benefitting the specific participants rather than trying to fit marginalised populations into existing jobs in the existing ‘regular’ organisations. While such entities often build on the tradition of the Work Integration Social Enterprises (WISEs) programmes, sponsored by governments in Europe and the United States in the 1990s, the new wave of such social enterprises are products of entrepreneurial activities by social and business entrepreneurs and take a variety of organisational and legal forms (Gidron, Monnickendam-Givon, 2017, p. 128).

A. Chan (2016, p. 1719-1720) describes social purpose enterprises like ordinary commercial entities that generate income through the exchange of goods and services, but operate with the added social objective of providing work opportunities to people who have experienced persistent difficulties finding or maintaining employment. The author states that these enterprises are often noted for their 'supportive' nature that accommodates the social and economic situations as well as the employment history and the skill level of their workers. They provide employment and job training to individuals with complex and often multiple challenges to work which include but are not limited to poor health, physical, psychiatric and developmental disabilities, insecure housing, limited formal education or work experience, language barrier, newcomer adjustment challenges, unaffordable childcare, and domestic violence (Chan 2016, p. 1719-1720). A. Chan (2016, p. 1720) presents information that the work opportunities in Canada can be part-time or full-time, short-term or permanent, these ventures are primarily not-for-profit and belong to any number of industries (e.g. food services, construction, courier services, bicycle repair, printing, recycling), including some that also provide micro-entrepreneurship training and support. Although they generate revenue through sales on the market or service contracts with the state, in most cases these organisations remain heavily reliant on other government funding, foundation grants, and volunteer support. They are often supported by a parent nonprofit organisation (Chan, 2016, p. 1719-1720).

According to Y- Ch. Cho and J.- H. Jang, (2014) in any case, social enterprises are generally understood in terms of a business model which meets both social and economic objectives, contributing to labour market integration and social cohesion (Cho, Jang, 2014, p. 119). The authors summarise that there are two key requirements for any enterprise to become a certified social enterprise in Korea. First, its primary business motivation must be the common good. Second, the primary business activity must be to manufacture a product and sell a service. Social enterprises in Korea should sell goods or provide services in the market for the purpose of generating income just like other enterprises, but their business motivation is to realize a social purpose rather than to maximise profits to shareholders. Therefore, social enterprises are expected to provide vocational training opportunities and jobs for vulnerable members of the society, protect and improve the environment, educate young people and expand social services for low-income and disadvantaged persons (Cho, Jang, 2014, p. 120).

According to V. Pestoff and L. Hulga (2015, p. 1751) the US social enterprises can take a number of different legal forms, while nonprofit organisations, on the other hand, are recognised and defined by law and they have a preferred status under the US tax law. In Europe, by contrast, the policy and legal context appears much more conducive to the development of social enterprises as welfare actors, given their more institutional nature. Moreover, European legal frameworks reflect specific legal traditions, welfare regimes, and economic issues dealt with at the national level (Pestoff, Hulga, 2015, p.1751). Thus governance structures have quite naturally attracted much more attention in Europe than elsewhere. In fact, it could be argued that the emphasis given to the governance issue perhaps reflects the most distinctive contribution of the EMES approach to date. Moreover, governance structure can also be seen as an organisational device to ensure the sustainable pursuit of a social enterprise's social mission (Pestoff, Hulga, 2015, p. 1754-1755).

T. Ramus and A. Vaccaro (2017) conclude that given their characteristics, social enterprises can be extremely successful in addressing complex social issues because they combine the efficiency and resources of the traditional business model with the sense of mission of the charity one (Ramus, Vaccaro, 2017).

J. Čižikienė and A. Urmanavičienė-Čižikaitė (2013, p. 27) refer to the EESC (The European Economic and Social Committee) that proposes to distinguish the characteristics of a social enterprise as follows: achieves social objectives rather than profit, has a variety of legal forms and models (cooperatives, mutual societies, voluntary associations, foundations, profit or non-profit companies); is engaged in business activities based on democratic principles including employees, customers and members of the general decision-making and management (Čižikienė, Urmanavičienė-Čižikaitė, 2013, p. 27).

V. Pestoff and L. Hulga (2015, p. 1755) state that it is widely recognised that the role of governance structure is a key issue in the European discussion of social enterprises, too (Pestoff, Hulga, 2015, p. 1755). Governance is also coming increasingly under scrutiny in many social science disciplines by becoming a key theoretical concept, not merely a normative prescription. Thus, the political dimension of social enterprises is a wider issue than ‘‘just’’ a question of installing inclusive governance mechanisms, since social enterprises have the characteristics needed to be contributing also to the shaping of norms, public policies, and the public sphere in general (Pestoff, Hulga, 2015, p. 1756).

The analysis of the results of the concept of social enterprises shows that various authors from different countries emphasise the same basic criteria for the concept of social enterprises which may be summarised as the economic dimension of a legal entity for ensuring economic activity of the entity, the social dimension – for the implementation of social policy of the entity and the governance-political dimension for the state support for social enterprises and the most vulnerable part of the society of the country (see Figure 2).

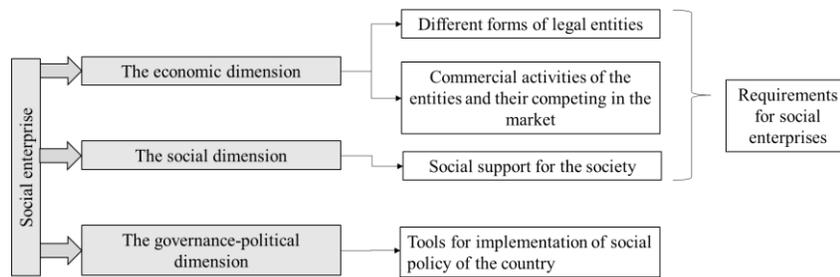


Fig. 2. The concept of a social enterprise

Source: composed by authors

Therefore, the concept of a social enterprise has to meet three core elements: be active as a legal entity, implement social policy of the entity and the social – political policy of the country.

4. The status of social enterprises in Lithuania

Social enterprises in the Republic of Lithuania are regulated under the Law of social enterprises, issued on 1 June, 2004, No IX-2251. The law stipulates that the purpose of social enterprises is to employ persons who have lost their professional and general employability, are inactive economically, unable to compete on the labour market on equal terms, to encourage their return to the labour market, to reinforce their social integration and to reduce social exclusion. The legal requirements for social enterprises and their types are presented in Figure 3.

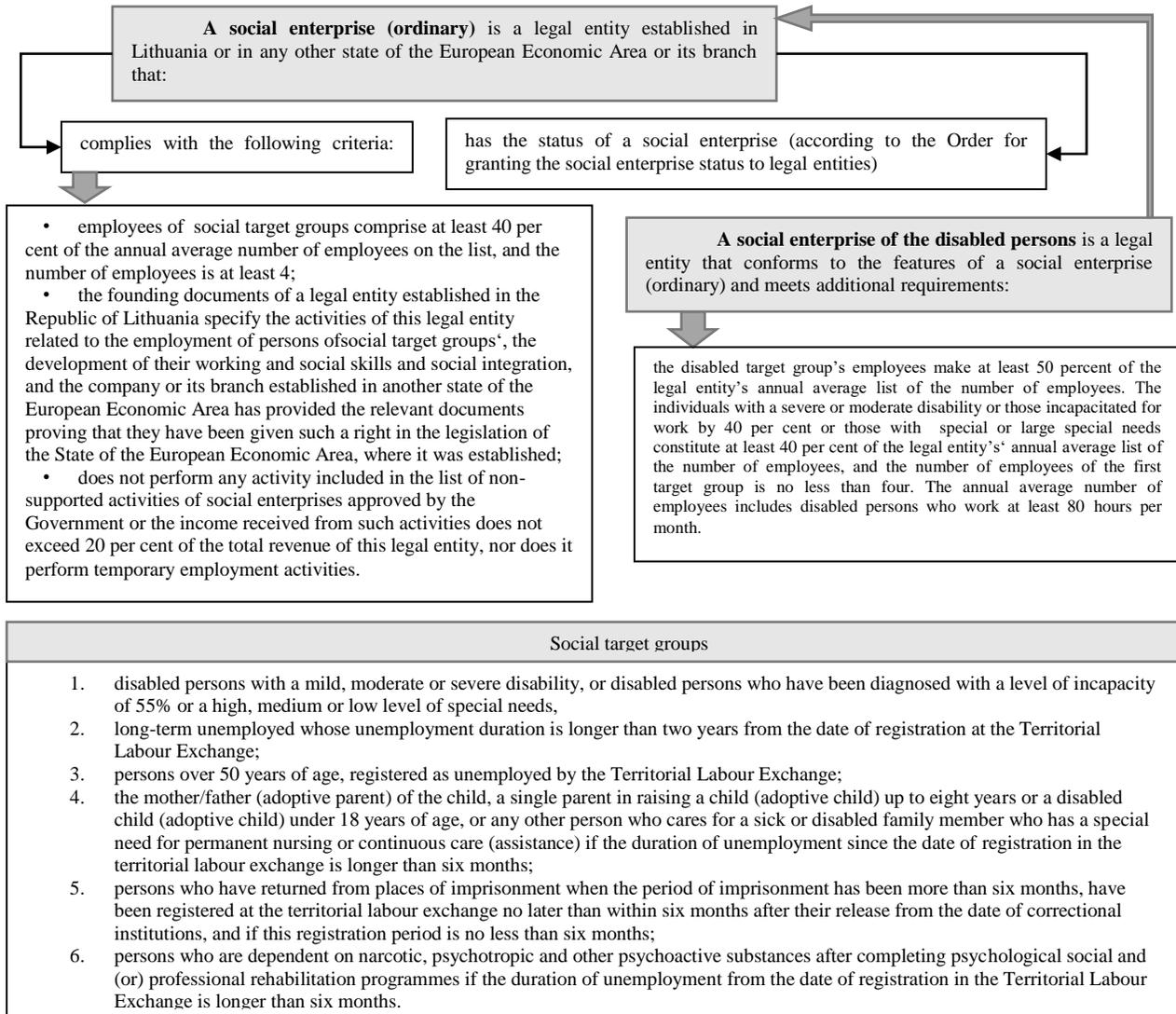


Fig. 3. Types and requirements of social enterprises

Source: composed by authors according to Lietuvos Respublikos socialinių įmonių įstatymas, 2017; Socialinės įmonės, 2018.

According to Figure 3, in general, social enterprises are legal entities that employ persons of social target groups who develop their working and social skills and social integration and who do not perform activities included in the list of non-supported activities in Lithuania.

In 2016 there were 172 social enterprises, 65 of them were social enterprises of disabled persons in Lithuania. Those enterprises employed 6,408 employees of special groups and 6,246 of them were disabled persons. Approximately 14 per cent of disabled persons work in social enterprises (SADM viceministrė, 2017). Table 1 presents the number and employment of disabled persons.

Table 1. The number and employment of disabled persons

Number of disabled persons / Year	2015	2016	2017
Overall	205,895	201,664	198,610
Working age	138,465	135,680	135,130
Employed persons	47,335	48,256	47,133
Employment (%)	34.19	35.57	34.88

Source: Neįgalumo statistika ir dinamika 2017

As of 1 August 2018, 142,700 unemployed persons (8.2 per cent of the working age population) in Lithuania were registered at the Lithuanian Labour Exchange. The number of the registered unemployed persons is presented in Table 2.

Table 2. The number of unemployed persons

Average number per year / Year	2013	2014	2015	2016	2017
Total number of unemployed persons	201,322	173,006	158,153	144,864	139,615
Number of disabled persons	12,432	11,434	10,949	10,376	9,927
Number of long-term unemployed persons	57,122	58,167	46,905	40,177	36,916

Source: Bedarbių struktūros pokyčiai, 2018

Table 2 shows that average number of the registered unemployed persons comprised more than 163 thousand persons during the last five years and the level of the indicator decreased by almost 10% per year from 2013. The average number of the unemployed disabled persons was 11,023 with the annual decline of the indicator of around 5%. The average rate of the number of long-term unemployed persons comprises around one third of the total number of unemployed persons with an average decrease of around 11% per year over the period from 2013 through 2017. The overall decline of all the indicators reflects an upward trend of growing economy in Lithuania.

The Seimas of the Republic of Lithuania and the Government of the Republic of Lithuania in cooperation with the Ministry of Social Security and Labour of the Republic of Lithuania are developing a policy of employment promotion and social support. This policy is implemented by the branches of the Lithuanian Territorial Labour Exchange, municipalities and their institutions (Aktyvios darbo rinko..., 2017).

According to their special status, social enterprises may receive state support: partial compensation of wages and social insurance contributions; a subsidy for the creation or adaptation of workplaces for disabled workers and the purchase or adaptation of their work equipment; a subsidy for training staff belonging to social target groups. Social enterprises of disabled persons may apply for additional state support: subsidy for adaptation of working environment, manufacturing and rest premises; subsidy for additional administrative and transport expenses; subsidy for the expenses of an assistant (sign language translator) (Socialinės įmonės, 2018; Lietuvos Respublikos socialinių įmonių įstatymas, 2017). For research purposes, social enterprises (ordinary) and social enterprises for disabled persons will be generally called as social enterprises and will not be analysed separately. The dynamics of state support for social enterprises is presented in Table 3.

Table 3. State support for social enterprises

Year	Number of social enterprises	Compensation of administration expenses, Eur	Subsidy for the expenses of an assistant, Eur	Partial compensation of wages and social insurance contributions, Eur	Subsidy for creation of workplaces, Eur	Subsidy for transport expenses, Eur	Subsidy for adaptation of workplaces, Eur	Subsidy for adaptation of working environment, Eur	Subsidy for training staff, Eur	Total support of state budget, Eur
2013	134	890.28	11 481.30	4 242 659.36	272 981.21	47 700.33	11 360.06	0.00	12 638.99	4 599 711.52
2014	141	831.94	21 556.11	5 104 695.52	400 767.12	50 303.34	5 931.42	0.00	0.00	5 584 085.45
2015	148	944.09	0.00	4 423 542.66	1 164 966.72	40 763.10	7 700.00	38 491.17	540.00	5 676 947.74
2016	172	1 024.93	26 315.96	9 992 363.94	1 197 571.25	31 036.74	0.00	29 978.68	26 513.33	11 304 804.83
2017	189	532.71	48 373.13	16 720 286.84	2 850 812.26	23 093.05	0.00	31 497.90	0.00	19 674 595.89

Source: The Lithuanian Labour Exchange, 2018

It is obvious that the largest part of state support (87% on average) is assigned to partial compensation of wages and social insurance contributions. State support for creation of working places varies from almost 6% to almost 21% and comprises on average around 12% of the total amount of state support for social enterprises. Other types of state support do not exceed 1%. Over the last five years an average increase of 3 768 721 Eur or 28% per year is observed in the total amount of state support for social enterprises. The largest increase of state support for social enterprises was recorded in 2016 and 2017 (almost 50% and 43%, accordingly). This trend might have triggered political discussions on state support tools for social enterprises and the changes introduced to Law on Corporate Income Tax and Law on Social Enterprises.

The Law on Social Enterprises determines social target groups of employees, the types, the requirements for social enterprises, rights and obligations, status of social enterprises, state support for social enterprises. On 28 June 2018, the Law on Amendments of the Law on Social Enterprises was passed, which decreased the limits of state support for social enterprises (Lietuvos Respublikos socialinių įmonių įstatymo..., 2018). The amendments were related with the types of state support, which comprise the largest part of the total amount of state support: compensation of wages and social insurance contributions decreased from 2 to 1.55 of the minimum monthly wages; the subsidy for the creation of workplaces – from the amount of 40 to 31.03 of the minimum monthly wages; the subsidy for adaptation of workplaces, working environment – from amount of 6 to 4.65 of the minimum monthly wages. The amendments will come into force on 01 January 2019.

The Law on Corporate Income Tax (Lietuvos Respublikos pelno mokesčio įstatymas..., 2017) stipulates the general terms of corporate income tax as well as some exemptions for particular types of activities, micro enterprises, public companies, etc. The standard corporate income tax rate in Lithuania is 15%. Although enterprises whose turnover for the fiscal period is less than 300,000 Eur, those who have less than 10 employees and meet the control conditions of other enterprises may pay 5% of corporate income tax. Apart from that, non-profit entities whose revenue from commercial activities for the fiscal period does not exceed 300,000 Eur, part of the profit, which consists of 7,250 Eur, is taxed by 0% rate of corporate income tax, and the remaining part of the taxable profit - by the tax rate of 15%. When calculating the income of commercial activity, non-profit entities do not include income which is directly allocated to meet the public interest activities. The exemptions for non-profit entities have taken effect since 2010. The profit of social enterprises was taxed by 0% rate from 2009 to 2018 (the exemption was repealed under a political initiative (Lietuvos Respublikos pelno mokesčio įstatymas..., 2017)). The Law on corporate income tax also determines the exemptions related to the incurred expenses, different types

of assets, loss transfer etc., but the evaluation of such exemptions is not possible, as the internal information of the enterprises is necessary.

The disabled and other persons of the social target groups are the most vulnerable part of the society of any country and the decrease of tax exemptions or the state support for business which involve such persons into different activities should be assessed in all possible aspects as the changes may limit the possibilities of social enterprises to continue such initiative, with this, to continue employment of marginalised population. According to N.L. Maxwell, D. Rotz (2017) by integrating a business mission into a transitional jobs programme, employment social enterprises provide temporary work and a supported work environment to reduce the barriers facing disadvantaged workers while generating revenue to cover production costs (Maxwell, Rotz, 2017).

In Lithuania, most private limited liability companies and public companies have the status of social enterprises. J. Čizikienė, A. Urmanavičienė- Čizikaitė (2013) analysed social enterprises in Europe and made conclusions that the forms of social enterprises are different in all EU Member States - cooperatives (different forms in Sweden, Italy, Great Britain), mutual societies, associations, foundations. Various forms of social enterprises are implemented in France, Belgium, and Portugal. Social enterprises cover a wide range of services and manufacturing market spectrum. They can provide services for a vulnerable part of the society and ensure social and professional integration through employing people who have found themselves at a disadvantage, are experiencing social exclusion, are without appropriate professional qualifications or have social problems (Čizikienė, Urmanavičienė- Čizikaitė, 2013, p. 27). Moreover, although the number of social enterprises is not significant, their role in social environment and policy of the country is major. This role inspires the need to evaluate the changes of legislation on the state budget of Lithuania.

5. Research results

During the third phase of the research, the total amount of profit and alternative corporate income tax were calculated in order to evaluate how much of corporate income tax could social enterprises have paid during the research period (see Figure 4).

Figure 4 shows several options of possible corporate income tax payments: corporate income tax calculated as 15% of the profit (see Formula 1), adjusted corporate income tax calculated according to tax exemptions (see Formula 2), for enterprises with the appropriate amount of turnover and number of employees, and public entities (see Formula 3), and the difference between the possible corporate income tax payment options. Over the period under analysis, social enterprises earned profit on average in the amount of 12 610 000 Eur and could have paid almost 1 900 000 Eur of corporate income tax per year if social enterprises did not apply corporate income tax incentive for social enterprises. Nevertheless, if social enterprises do not apply tax exemptions for the social enterprises, they might apply corporate income tax exemptions for enterprises with the appropriate amount of turnover and the number of employees, or exemptions for public entities. The recalculation of the adjusted corporate income tax according to the exemptions show that on average more than 1 600 000 Eur of corporate income tax per year would be paid and the adjusted corporate income tax rate would make around 12.43%. The largest impact on such results was observed in 2013, as the adjusted corporate income tax rate for that year was 4.38%. These results may be influenced by the consequences of the global economic crisis of 2008. If the results of 2013 were eliminated the average adjusted corporate income tax rate would be 14.44%.

Formula 1 for the calculation of 15% corporate income tax:

*Corporate income tax (15%) = profit * 0.15*, where

profit – is the sum of the profit of all the analysed social enterprises. The calculations have not included loss.

Formula 2 for the calculation of the adjusted corporate income tax, according to corporate income tax exemptions for enterprises with a turnover of less than 300,000 Eur, less than 10 employees and they meet some conditions of the control of other enterprises:

$Corporate\ income\ tax\ (adjusted) = profit_{<300,000\ (rev.)} * 0.05 + profit_{>300,000\ (rev.)} * 0.15$, where

$profit_{<300,000\ (rev.)} * 0.05$ – is the sum of the corporate income tax of all the social enterprises whose turnover for the fiscal period was less than 300,000 Eur.

$profit_{>300,000\ (rev.)} * 0.15$ – is the sum of the corporate income tax of all social enterprises whose turnover for the fiscal period was more than 300,000 Eur.

Formula 3 for the calculation of the adjusted corporate income tax for public entities (PE), according to corporate income tax exemptions for public entities:

$Corporate\ income\ tax\ (adjusted\ for\ PE) = profit_{<7,250} * 0 + profit_{(actual\ profit - 7,250)} * 0.15$, where

$profit_{<7,250} * 0$ – is zero, as profit (or part of the profit) of public entities below 7,250 Eur is taxed by corporate income tax rate of 0%.

$profit_{(actual\ profit - 7,250)} * 0.15$ – is the sum of the corporate income tax of public entities for the part of profit, which exceeds 7,250 Eur.

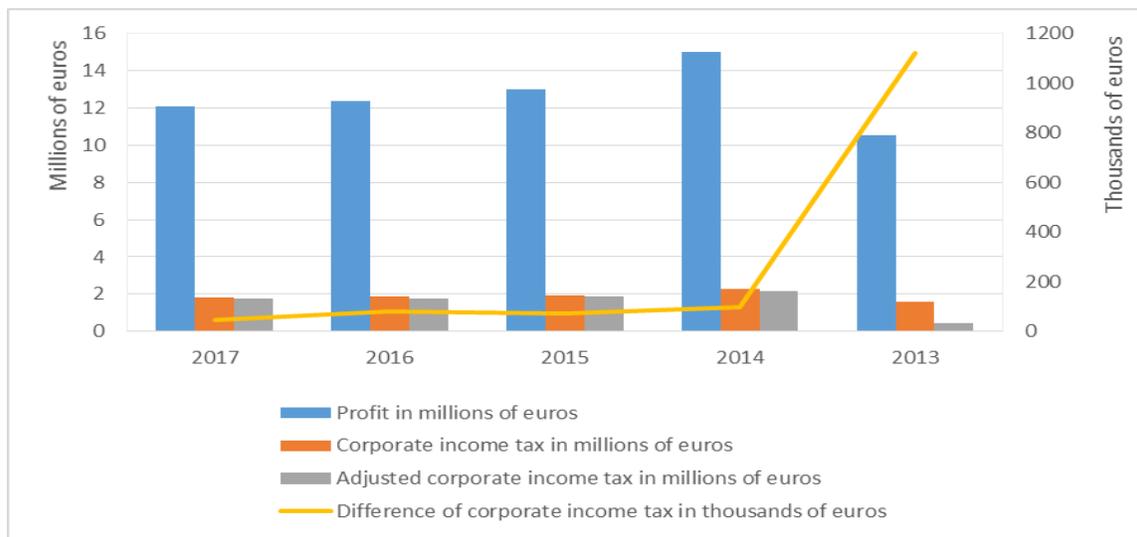


Fig. 4. Analysis of the possible corporate income tax payment options

Source: composed by authors according to the research results

Taking into account that the difference between both possible corporate income tax payment options is not significant and the probability that social enterprises will apply other forms of corporate income tax exemptions (if not the exemption for social enterprises) is extremely high, the adjusted corporate income tax will be used for further research. Corporate income tax exemptions influence the state income of corporate income tax which makes around 10% of the total state budget revenue (our calculations did not include the state budget revenue the EU and other organisations support). Figure 5 presents the comparison of the adjusted corporate income tax and the state revenue of corporate income tax. The comparison of the results show that possible adjusted corporate income tax payments carried out by social enterprises would comprise on average around 0.3% of the state income of corporate income tax during the period under analysis. This percentage may be evaluated as insignificant and unable to make a significant impact on the state budget's revenue of corporate income tax.

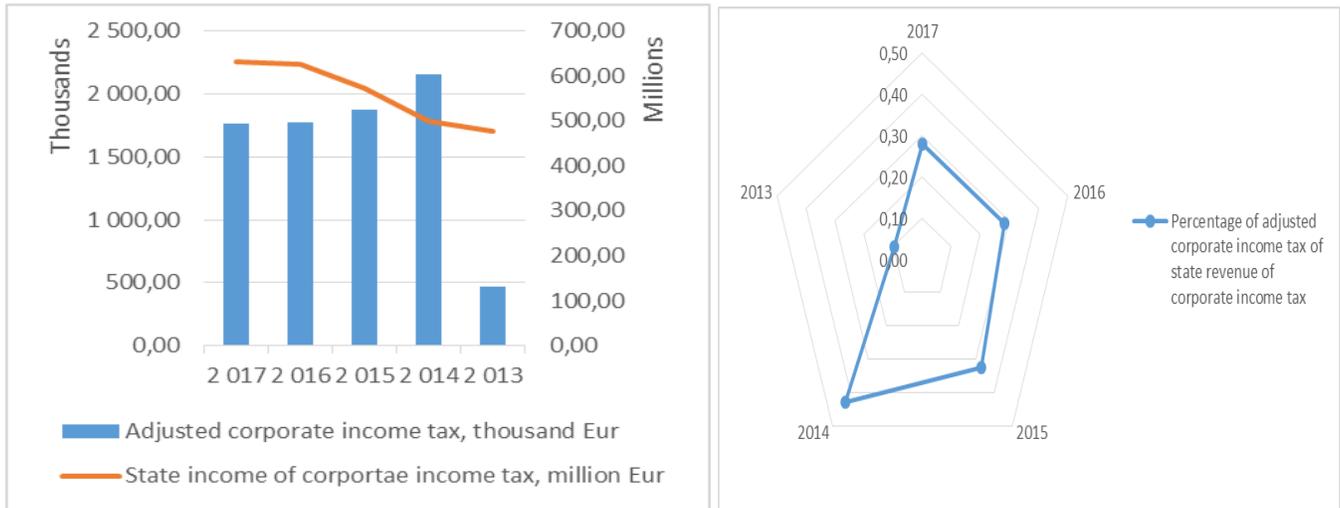


Fig. 5. Comparison of the adjusted corporate income tax and the state income of corporate income tax
 Source: composed by authors according to the research results and Valstybės biudžeto vykdymo duomenys, 2018

As mentioned above, social enterprises are able to receive the state support of different types from the state budget (see Table 2). On average the total amount of the state support for social enterprises comprised 0.16% of the state budget during the period under analysis, but rapidly increased from 2016 and in 2017 and made 0.33%. Even such value of the state support for social enterprises may not be evaluated as significant, but the increasingly growing trends initiated the amendments of legislation and were limited by the changes in the Law on social enterprises. The structure of the total amount of reliefs (exemptions), including corporate income tax exemptions and state support, and the percentage of the state budget is presented in Figure 6. The state support made on average around 83%, and in 2013 and 2017 exceeded 90% that comprised the largest part of the total amount of reliefs. Over the last five years the total amount of reliefs for the state budget covered on average 0.18 %, with the lowest level of 0.09 % in 2013 and the highest – 0.34 % . in 2017.

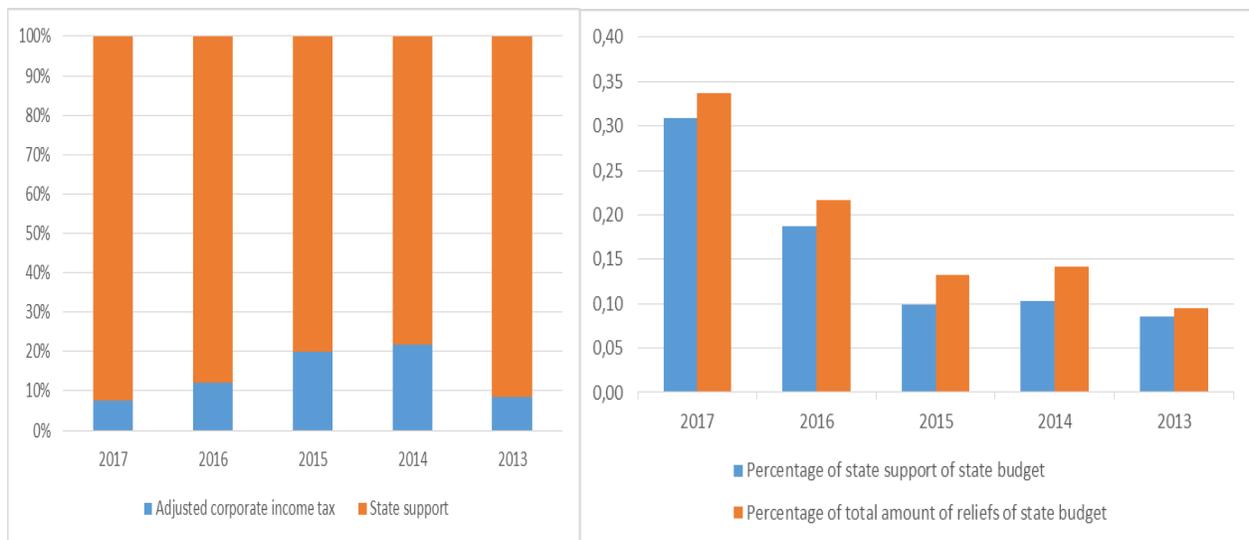


Fig. 6. Structure of the total amount of reliefs for social enterprises and the percentage in the state budget
 Source: composed by authors according to the research results and Valstybės biudžeto vykdymo duomenys, 2018; The Lithuanian Labour Exchange, 2018.

The political initiative to reduce the support for social enterprises may be grounded by a double increase of the total amount of reliefs for social enterprises during 2016-2017 but still the highest percentage of the total amount of the state budget in 2017 may be evaluated as insignificant and should be evaluated generally including the impact of the elimination of reliefs on social policy and the condition of persons of social target groups.

For social enterprises, traditional donations and grants (non-earned income) remain an important source of revenue. Non-earned income is an attractive and useful revenue source for all social enterprises because it is not repayable and does not give any explicit and enforceable control or voting rights to donors. It also enables social enterprises to pursue activities without income-generating potential - i.e. value-creating as opposed to value-capture activities. Moreover, young and growing social enterprises are often unable to secure alternative funding such as loans, investment funds and capital; hence, non-earned income is their only option (Liston-Heyes et al 2016).

A. Szymanska and M. Jegers (2016) research results on the optimal solution show that social enterprises have a strong potential to realise their social mission and to run sufficiently profitable business at the same time. They have proved that, in the short-term, the social enterprise is motivated in reinvesting its profits in the process of the social mission realisation but authors can expect that in the long-term (applying a dynamic framework) the social enterprise might also be interested in keeping some savings for its strategic investments. The authors conclude that the optimal allocation between labour and debt, both necessary for social production, has a significant impact on the social mission realisation (Szymanska, Jegers, 2016, p. 514).

It may be summarised, that state support provided by different tools is important and significant for social enterprises and plays an important role for the development of the activity of social enterprises, although the research results show that the value of corporate income tax exemptions and state support is not significant in terms of state budget of Lithuania. Therefore, the research included general evaluation of different forms of state support for social enterprises and their impact on state budget of Lithuania, the direction for further research of social enterprises in Lithuania may be related to the evaluation of the dynamics of employment of persons of social target groups as well as the total amount of relief level in the long term, which would reflect the implementation of legislation amendments and the condition of persons of social target groups.

Conclusions

The concept of a social enterprise may be concluded in three dimensions: economic dimension - as an active legal entity, social dimension – as an implementer of social policy and governance-political dimension – as part of social policy of the country. In Lithuania, the procedure of granting of the status of a social enterprise requires that the enterprises are subject to special obligations as they are legal entities who employ persons who have lost their professional and general employability, are inactive economically, unable to compete on the labour market on equal terms with other employees, develop their working and social skills and social integration, and do not perform the activities included in the list of non-supported activities.

Social enterprises may receive different types of state support in Lithuania. The largest part of state support involves partial compensation of wages and social insurance contributions (approximately 87%). The state support for the creation of working places makes on average around 12%, other types of state support do not exceed 1%. Over the last five years, the total amount of the state support for social enterprises was increasing on average by 28% per year.

The results of comparison of adjusted corporate income tax and state income of corporate income tax show that possible payments of adjusted corporate income tax of social enterprises may be evaluated as insignificant and

over the analysed period would make on average around 0.3% of the state income of corporate income tax. The total amount of the state support for social enterprises in the state budget comprised on average 0.16% but accelerated in 2016 and reached 0.33% in 2017. The evaluation of the structure of the total amount of reliefs (exemptions) and the percentage of the state budget show that the largest part of the total amount of reliefs for social enterprises which includes corporate income tax exemptions and state support, comprised state support – in average around 83% during analysed period and exceeded 90% in 2013 and 2017. The total amount of reliefs comprised on average approximately 0.18% of the state budget.

The research results show that in terms of state budget of Lithuania, the value of corporate income tax exemptions and state support is not significant. Nevertheless, the state support provided by different tools is important and significant for social enterprises and plays an important role in the development of the activities of social enterprises. The direction for further research of social enterprises in Lithuania may be related with the evaluation of the dynamics of employment of persons of social target groups as well as the level of the total amount of reliefs in the long term. The increase of the value of state support in 2016 and 2017 may be evaluated unfavourably, but the suggestions for an additional control of the provision of status of social enterprises and their social activity may limit the misuse of state support. The cancelation of corporate income tax incentive for social enterprises is even less significant in the measurement of the total amount of reliefs and does not play an essential role in the state budget as it comprises only approximately 0.03%. Therefore, the general reduction of state support and corporate income tax exemptions may limit the possibilities of social enterprises to reinvest their profits, expand business and employment of marginalised population.

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ECONOMICS OF THE INTERNATIONAL RIDESHARING SERVICES - A TRAP FOR AMATEURS

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Abstract. An explosively growing international business model of peer-to-peer ridesharing brings benefits to the customers and provides part-time and full-time jobs for the drivers. While the services are provided mostly by the drivers with low knowledge of economics and finance, provision of the services might be a trap for them in case that they do not take into consideration all costs related to the service provision. The aim of the study was to investigate the economics of the ridesharing providers in case of UBER in Prague, and to create a simulation model estimating the annual performance of the ridesharing transport service operators and classic taxi service from the point of view of individual drivers, considering certain deviations and random effects defined by the stochastic methods using Monte Carlo approach. The results of the modelling show that the net income of Uber drivers is compatible with the taxi drivers only in case of the most expensive Uber Black category, but the net income of ridesharing providers in the category of Uber Pop and Uber Select hardly covers the costs of service provision. The alarming fact is that most of the drivers, who took part in our research, were not capable to acknowledge the hidden costs of ridesharing and were blinded by the vision of a short-term cash incomes without any awareness of the existence of the postponed or implicit costs. While our results confirm that Uber drivers in general are significantly underpaid, Uber Pop and Uber Select services generate a loss for the driver when we take into account the implicit costs of the driver's salary at the level of an average salary in the Czech Republic.

Keywords: sharing economy; ridesharing; economics of ridesharing; Uber; taxi

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Additional disciplines: economics of ridesharing, sharing economy

1. Introduction

The sharing of the private assets of individuals is a key element of a sustainable economic system called the sharing economy. Cao (2016) defined the sharing economy as an organized economic activity that may supplant the traditional corporate-centered model and encourages peer-to-peer transactions, and as a system of sharing underused assets or services, for free or for a fee, directly from individuals, bypassing traditional middle men. The concept of peer-to-peer ridesharing, that brings benefits to the customers and provides part-time and full-time jobs for the drivers and at the same time influences the transportation markets worldwide, is a recent and widely discussed topic (Ciobanu & Androniceanu, 2018, Dillahunt et al., 2017, Chang, 2017, Jurigova & Tuckova, 2016, Ključnikov & Belás, 2016, Ključnikov & Popesko, 2017, Kovács, 2017; Mura & Sleziak, 2014, Ngo & Pavelková, 2017, Sachpazidu-Wójcicka, 2017, Szilágyi, 2017, Rayle et al., 2016. Rodas Vera & Gosling, 2017, Southern et al., 2017, Tuckova & Strouhal, 2010, Vavrečka & Mezulánik, 2016). While the services are provided mostly by the drivers with low knowledge of economics and finance, provision of the services might be a trap for them in case that they do not take into consideration all costs related to the service provision.

The aim of the study was to investigate the economics of the ridesharing providers in case of UBER in Prague, and to build a simulation model estimating the annual performance of the ridesharing transport service operators and classic taxi service from the point of view of individual drivers, which takes into consideration all explicit and implicit costs of the ridesharing providers, and considers certain deviations and random effects defined by the stochastic methods using Monte Carlo approach.

2. Literature review

The database of the Web of Science currently includes 289 articles, at least partially related to ridesharing and its economical aspects. Most of the relevant papers, devoted to this field of study, are very current, published mostly in the last three years. Business models represent the basis of any successful business (Slávik and Zagoršek, 2016; Rajnoha and Lesníková, 2016; Wroblowska, 2016; Rajnoha and Lorincová, 2015), being defined as how an organization creates value and captures return from that value and containing the following elements: value proposition, customer segments, key activities, key resources, key partnerships, cost structure, revenue streams, customer relationship, channels according to the nine building block canvas of Osterwalder and Pigneur (2010). Elements of business models have been inquired by more authors in the literature regarding several fields of activity, for example, renewable energy (Tanțău and Nichifor, 2014), energy efficiency (Chang et al, 2017; Tvaronavičienė, 2018), and entrepreneurial business models based on efficiency (Păunescu, 2013; Moraru et al, 2017, Tvaronavičienė, 2017; Shumakova et al, 2018), researching practically the implementation of the nine building blocks canvas of Osterwalder and Pigneur (2010) in several business sectors or in different lifecycle stages of a business. A main objective of the efficiency and effectiveness of a business model is thus, the customer-perceived delivered value by the organization, which can influence the relationship between customers and organization in terms of failure severity, perceived justice dimensions and satisfaction, as the study of Jha and Balaji (2015) indicated. If the value of the delivered products or services fails to be perceived by the customer it can lead to difficulties in maintaining customer loyalty or gaining new customers, that can lead to business failure in time as well.

Another main issue of entering a new market with a new type business refers specifically to three elements of the nine building block canvas, specifically to how their business will cooperate with business partners, such as suppliers, customers and other with a main purpose of aiming to reduce the operations and other business costs for all the parties involved (Păunescu, 2013). This represents a main challenge in order to establish a successful and efficient position on the market. The pressure towards more knowledge, networking, efficiency and effectiveness of applying business models elements into practice originates from the development of some main factors of the

business environment, such as: the fast pace of technology evolution, increased standards of customers and other employers and thus, competition, internationalization, accreditation pressure and qualitative standards (Dima and Vasilache, 2016). These elements were also present in the case of introducing UBER on the market, as a new business model concept of ridesharing transport service versus the classical taxi driving services.

Regarding the ridesharing sector Dillahunt et al. (2017) concluded that Real-time ridesharing services are often touted as sharing-economy leaders and dramatically lower the cost of transportation and argued that low digital literacy of the users and providers can make such services infeasible and disadvantageous.

Chang (2017) empirically assessed the economic impact of Uber service on taxi drivers' business performance using a case study in Taiwan as an illustration and found that Uber reduced regular taxi drivers' service revenue by approximately 12 percent in the initial year and 18 percent in the third year of entry of Uber. The author also stated that the negative impacts of Uber on taxi drivers' service revenue are more likely associated with the reduction in operating miles of taxi drivers. Krželj-Čolović et al. (2016) show clustering has important effects on the small and medium enterprises and possible effects can be mirrored in future Uber services.

The issue of the economics and cost of driving trips was for instance assessed by Southern et al. (2017) and Kot (2015) who identified an existence of the awareness gap, and built and deployed a system that makes the total cost of each driving trip, including the cost, mostly hidden for an amateur user, including depreciation, maintenance, insurance, and fuel visible, so the drivers were able to more accurately and confidently estimate costs of their driving commutes, and better estimate their net income.

Rayle et al. (2016) and Ključnikov et al. (2018) presented the findings that indicate that, despite many similarities, taxis and ridesourcing differ in user characteristics, wait times, and trips served.

Cao (2016) stated that the regulatory regimes in place prior to the rise of the "sharing economy" should be revisited and appropriately restructured for these newly emerged business models. Moderate approach to regulation is also recommended by Svecova & Veber (2017). Arshov and Bucevska (2017) show efficient regulatory framework based on transparency and good governance practice in transitional economies lack behind western economies. This could be a large obstacle for collaborative economy diffusion in former transitional economies.

Miguel Rodriguez-Anton et al. (2016) even taking into consideration the fact the European Union has clearly adopted a position in favour of collaborative economy state that in order to have a proper coexistence between the activities developed in a collaborative economy area as well as a traditional one, it is necessary to have regulations providing clear rules of the game.

While most of the authors devote their attention to the model of ridesharing, the problematics of the economics of the ridesharing providers and the financial performance of the ridesharing transport service operators from the point of view of individual drivers is not sufficiently covered by the scientists (Ohanyan, Androniceanu, 2017).

3. Methodology

The modelling of the economy of the driver was carried out in the simulation software Powersim by Solvico (<http://www.powersim.com/>). The simulation model estimates the annual performance of the transport service operator or taxi service from the point of view of individual driver, considering certain deviations and random effects defined by the help of stochastic methods using pseudo-random numbers (Monte Carlo). The model involves all related variables, interconnected by the defined relations. The input data for modelling comes from both public sources (the revenue side in particular) and the questionnaire surveys described above.

Based on the analysis of the methods of transport services provision, the research team prepared several partial models of the economy of operation that included:

- traditional taxi services operated by the own vehicle of the driver, and operated by the vehicle leased through the operational leasing;
- commercial transportation on the UBER platform, provided by the private vehicle up to 10 hours per week in Shared Economy mode (approx. 30 percent of all UBER drivers) for Uber Pop and Uber Select price variants;
- full time commercial transportation on the UBER platform on Uber Black and Uber select price variants on both owned and leased vehicle.

The model takes into consideration all explicit and implicit costs of the ridesharing providers and allows the user to define the following parameters:

- travel parameters (average journey time, paid by the customer, the average length of the trip to the customer (delivery of the vehicle), length estimation deviation in %, car use ratio for private purposes (0-100%, this parameter determines in which ratios the selected cost types will be reflected in the cost of the economic model of the transport services), number of trips per day);
- general costs (fuel costs, expected change in fuel prices per cent per year, period of amortization);
- revenues (rate for 1 km, initial rate, waiting rate, average waiting time);
- service-related costs (car price, operating leases costs, average fuel consumption, service costs, price for a set of tires, the average life of the tire set, tire replacement price, annual cost of liability insurance, annual cost of accident insurance, annual cost of taxi place, annual technical control costs, annual road tax, the annual price of the taximeter verification, monthly cost of parking space, cleaning expenses, frequency of cleaning, highway toll price, fee of the provider of clients (Uber, taxi service)).

4. Data

Our research team investigated the economics of the ridesharing providers in case of UBER in Prague from the point of view of individual drivers. We have performed two surveys focused on the economics of transportation services in Prague.

The first survey was conducted in 2017 via questionnaire, created at the Google Docs platform and distributed to all users of Liftago, one of the main transportation service provider in Prague. The number of the respondents that fulfilled the questionnaire was 353 out of 1000 registered users of Liftago. This questionnaire was mainly focused on verification of all related costs and all related parameters of taxi services in Prague. While the total population of the taxi drivers in Prague reaches the number of 7000, we consider the data sample to be representative at the level of reliability of 95 % (significance 0.05, error rate 1.5 %, accuracy of 0.5 %).

The second survey was focused on the Uber drivers, and was conducted in 2017 by the personal interviews of the Uber drivers. The survey was focused on validation of the data from the first survey in case of Uber platform, finding specifics and differences in case of full time and part time Uber drivers. The total number of the respondents was 49. While the total population of the Uber drivers in Prague reaches the number of 2000, we consider the data sample to be representative at the level of reliability of 95 % (significance 0.05, error rate 3 %, accuracy of 2 %).

5. Results and discussion

Our research team investigated the economics of the ridesharing providers in case of UBER in Prague from the point of view of individual drivers. We have performed two surveys focused on the economics of transportation services in Prague.

The values of each parameter in the simulation were subsequently defined for each sub-model based on a field survey. The average length of the journey with the customer in case of taxi was calculated based on data from the Liftago questionnaire survey that included the number of daily journeys, the number of hours worked per week, the expected number of 49 working weeks per year, and the number of mileage estimated by taxi drivers.

The average length of the journey to the customer (vehicle delivery) in case of taxi was calculated on the basis of data from the Liftago questionnaire survey in a similar way, and took into consideration the mileage difference between the total mileage the paid distance.

The average length of the journey with the customer in case of Uber was calculated based on the UBER questionnaire survey of the number of daily journeys made and the number of mileage estimated by the UBER driver. The average journey time in the case of Uber is slightly lower than in the case of taxi service.

The average length of the journey to the customer (delivery of the vehicle) in case of Uber was determined on the basis of an expert estimation in the value of 100% of the average length of the paid journey.

The number of journeys per day was defined for each service as the average of the estimations of the drivers of the service. The number of rides per day reported by Uber drivers was almost twice as high as in case of the taxi drivers.

The expert estimation of the deviation of the length for the simulations was set at the level 20%, and the expected change in the prices of the fuel at the level of 5% per year.

The parameters *car use ratio for private purposes, car price, operating lease price per month, average fuel consumption, service costs, tire set price, average tire life, tire replacement cost, liability, the annual cost of the liability, the annual cost of the accident insurance*, were defined on the basis of a questionnaire survey.

The other parameters, including *the commissions of intermediaries, annual state technical control, yearly taximeter verification price, motorway price, car cleaning price, depreciation period, monthly parking space price* were defined based on information from public sources and on information from Liftago drivers survey.

Fuel costs were determined on the basis of the average fuel prices listed on the Peníze.cz server (<https://www.penize.cz/en/press-payments-and-centers/history/table>) for Prague and were increased by CZK 1.

Based on these values, the annual economic result is simulated from the point of view of individual drivers, considering certain deviations and random effects, using stochastic methods using pseudo-random numbers (Monte Carlo).

The questionnaire survey shows that operating leasing vehicles have an average consumption of 0.4 l / 100 km on average, due to lower vehicle age. Tires and vehicle service costs are included in operating lease costs. The investigation also shows that the maximum number of km travelled by the leased vehicle is not usually limited.

Table 1. The results of the annual modelling of the economics of transport services

Model	Taxi (VA)	Taxi (L)	U-Pop	U-Select	U-Black (VA)	U-Black (L)
Number of rides	2 779	3 140	1 097	1 097	5 479	5 479
Number of kilometres	58 528	76 669	20 982	20 982	104 811	104 923
Total revenues (CZK)	866 092	1 052 180	137 864	179 161	1 699 844	1 701 351
Total expenses (CZK)	385 566	502 376	119 171	129 495	828 968	906 677
Net income before taxes (CZK)	480 526	549 804	18 693	49 666	870 876	794 674
Net income before taxes (EUR)	18 993	21 731	738	1 963	34 421	31 410

Source: Own processing. Note: VA – own vehicle, L – operating lease, CZK/EUR rate is 25.3.

The results of the simulation shows that provision of UBER Pop and Uber Select services in sharing economy mode generates relatively low incomes. In the case of occasional provision of this service, the driver would not incur any additional (or very minimal) tax liability on personal income tax. In addition to this income limit, the taxpayer is not obliged to pay the social and pension insurance.

Based on these findings, it can be concluded that *a) there is no significant tax evasion at the level of individual service providers in the ridesharing and b) the actual net income before taxes, that includes all explicit and implicit costs of ridesharing providers is extremely low and reaches the level of only approximately 61.5 EUR per month in case of Uber Pop and 163.58 EUR per month in case of Uber Select.*

The important fact is, that the model does not include the implicit cost of the wage of the driver. If we assume that one average ride, including the trip to the customer, takes approximately 30 minutes, the hourly wage of the driver in case of the Uber Pop is only 1.44 EUR, and 3.57 EUR in case of Uber Select. While according to the report of the Czech statistical office (2018) the average wage in the Czech Republic in 2017 reached the level of 29 504 CZK (1166,16 EUR), and the average hourly wage was 7.28 EUR, Uber drivers are significantly underpaid.

The alarming fact is that most of the drivers, who took part in our research, were not capable to acknowledge the hidden costs of ridesharing and were blinded by the vision of a short-term cash incomes without any awareness of the existence of the postponed or implicit costs.

This awareness gap was addressed by Southern et al. (2017), who built and deployed a system that makes the total cost of each driving trip, including the explicit and implicit costs visual for an uneducated driver, and let him better estimate the net income.

Our results are also conformal with Dillahunt et al. (2017), who concluded low literacy of the ridesharing providers can make such services disadvantageous for them.

A more detailed analysis of the economic models of taxi and Uber drivers shows that the revenues of the Uber drivers are higher in comparison with the traditional taxi drivers. The deeper analysis shows that these results are influenced by a different setting of partial service delivery parameters in terms of number of journeys and their

lengths. This finding is conformal with the results of Rayle et al. (2016) and Simarmata and Ikhsan, (2017), who stated that despite many similarities, taxis and ridesharing differ in user characteristics, wait times, and trips served.

To compare the performance of taxi vs Uber drivers in the equal conditions we have compiled a partial model with the following parameters: *average journey time (payable by the customer) - 11.00 km; average journey time to the customer (delivery of the vehicle) - 9.00 km; the ratio of car use to private use - 15.00%; number of trips per day - 12,00.*

The results of the modelling are shown in the following table.

Table 2. The results of the annual modelling of the economics of transport services

Model	Taxi (VA)	Taxi (L)	U-Pop	U-Select	U-Black (VA)	U-Black (L)
Number of rides	3 128	3 128	3 128	3 128	3 128	3 128
Number of kilometres	62 588	62 588	62 588	62 588	62 588	62 588
Total revenues (CZK)	988 790	988 790	437 743	569 476	1 092 060	1 092 060
Total expenses (CZK)	399 639	473 883	385 307	418 240	564 936	644 898
Net income before taxes (CZK)	589 151	514 907	52 436	151 236	527 124	447 162
Net income before taxes (EUR)	23 286	20 352	2 072	5 977	20 834	17 674

Source: Own processing. Note: VA – own vehicle, L – operating lease, CZK/EUR rate is 25.3.

The results of the modelling in the equal conditions show, that in case that the driver wants to deliver transportation services as a full time job, his earnings will be higher in case that he will work under the licence of a taxi driver. At the same time, despite the increased costs associated with obtaining a taxi license, the provision of a classical taxi service is more advantageous compared to the cooperation with the Uber service.

Earnings of the Uber drivers are compatible to taxi drivers only in case of Uber Black. Uber Pop and Uber Select services generate a loss for the driver if he takes into consideration an implicit cost of his wage at the level of an average wage in the Czech Republic. Under normal commissioning, Uber pockets more funds than traditional taxi providers or alternative applications. Aggressive Uber strategy was also mentioned by Chang (2017). Driving for Uber will be more advantageous in peak times when prices are rising, and this is probably the reason why drivers combine Uber with the other services.

Based on the results of the simulation we can state that the operation of transport services by a vehicle acquired through the operational leasing is less advantageous compared to the use of the own vehicle. The results are the same for the classic taxi service and the Uber.

Conclusions

The aim of the study was to investigate the economics of the ridesharing providers in case of UBER in Prague, and to create a simulation model estimating the annual performance of the ridesharing transport service operators and classic taxi service from the point of view of individual drivers, considering certain deviations and random effects defined by the stochastic methods using Monte Carlo approach.

The main results of the research are as follows. The results of the modelling show that the net income of Uber drivers is compatible with the taxi drivers only in case of the most expensive Uber Black category, but the net

income of ridesharing providers in the category of Uber Pop and Uber Select hardly covers the costs of service provision. The alarming fact is that most of the drivers, who took part in our research, were not capable to acknowledge the hidden costs of ridesharing and were blinded by the vision of a short-term cash incomes without any awareness of the existence of the postponed or implicit costs. While our results confirm that Uber drivers in general are significantly underpaid, Uber Pop and Uber Select services generate a loss for the driver when we take into account the implicit costs of the driver's salary at the level of an average salary in the Czech Republic.

We consider the scale and validity of our dataset with the level of reliability of 95 % (significance 0.05, error rate 1.5-3 %, accuracy of 0.5-2 %) for a strength of our research. The research was conducted only in one European city and that may be considered for a most substantial weakness of the research. We would like to validate the results of our research in case of other large cities in the V4 countries in the future.

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**FACTORS FOR EFFICIENT USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES
INFLUENCING SUSTAINABLE POSITION OF SERVICE ENTERPRISES IN SLOVAKIA***

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Abstract The importance of the service sector is constantly increasing. This statement is proved by the development of macroeconomic indicators such as value added and employment in services. However, in the current fast changing market environment it is difficult for service enterprises to succeed in competition. The specific service features significantly influence the production and exchange processes that determine the key sources of production which are namely skilled labor force and the use of ICT. Many authors proved that innovation and ICT together with a skilled workforce and with the necessary digital skills are factors of sustainable competitive advantage and of increasing productivity in services. Implementation of basic ICT into the processes of the enterprise may or may not bring competitive advantage to an enterprise or increase its performance. An intention of this article is to identify the factors which influence an efficiency of established ICT in services, also to quantify their contribution to performance and to the sustainable position of service enterprises in Slovakia.

Keywords: service sector; information and communication technologies; sustainable and stable position; factors of effective use of ICT; human capital; business processes

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1. Introduction

Globalization of the world economics have brought and formed a new generation of services. Services have become an important sector and at present they retain essential impact on GDP as well as on the process of creating new work positions. While in the sixties services represented a minority in the total economic output, now their share on GDP in the most developed countries exceeds 70% and is still increasing (Cram, 2012). The

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process of Slovak economic approaching the developed economics of the European Union resulted into positive changes in the growth of the service sector measured by the share of value added and employment 61% in 2016 (World bank, 2018). Therefore, the service sector employs nearly two-thirds of workers. Based on the past development and development in EU countries there is an assumption that the service sector will continue to provide new job opportunities.

However, given the current highly competitive environment and turbulent market changes, it is difficult to secure a sustainable and stable position for service enterprises. Porter (1990) described the importance of innovation and ICT as a factor in the competitiveness of services, but he also sees indispensability in quality management and qualified workforce. Introducing new, progressive ICT tools into the business processes of service-shaping services and increasing their competitiveness is therefore a current challenge. These include, for example, widespread use of the Internet to develop the marketing of service enterprises, as well as the widespread use of complex information systems and the interconnection of individual information flows (Raudeliūnienė et al., 2018a, 2018b; Tvaronavičienė et al., 2018; Ragulina et al., 2018).

In order to increase the competitiveness of services according to the OECD (2012), it is also necessary to choose the appropriate workforce with the necessary digital skills, and to increase the digital skills of the permanent employees and the skills of the consumers.

ICT has now reached a position that provides a strategic advantage and a sustainable competitive advantage. Also, investments and innovations enabling the advancement of information and communication technologies contribute significantly to productivity growth and have a major impact on competitiveness in services (European Commission, 2012). Hackley (2005) states that in order to gain a competitive advantage in services, it is necessary to digitize business processes and to implement appropriate information systems that give service enterprises the opportunity to expand on the market. He also emphasizes the important role of online marketing tools as a possible competitive advantage. In ICT investments, the services sector is at the forefront of other sectors, as stated by Lush, Vargo (2004), the result is that added value of services is boosted. In addition, in the service sector, production is predominantly based on information and knowledge, and if services are expected to remain competitive, it must implement and use information and communication technologies (Berr, 2008). Ghani, Goswami and Kharas (2012) confirm that the number of such service enterprises in the service sector, whose portfolios can be accessed by customers through the digital market without country borders, is increasing. The result is elimination of any barriers and even smaller enterprises are given the opportunity to use more sophisticated ICT.

Over the last decade, the implementation of information and communication technologies into service processes has required considerable investment which has not been used efficiently in many cases. Salah (2003), through his research, demonstrated that 75% of ICT investment in services did not meet the business objectives because there was not enough attention paid to the introduction of ICT. Failures and missed opportunities led to a loss of strategic advantages for enterprises, resulting in lower levels of future investment in information and communication technologies (Goulding, Alshawi, 2004; Peppard, Ward, 2004; Zuhairi, Alshawi, 2004). However, this condition was not only caused by unskilled workforce in general, but was primarily due to a lack of knowledge within the management. The management, which was unable to identify the functionality neither to quantify the contribution of information and communication technologies to the enterprise. This is an important fact because ICT workers have no knowledge of the course and economy of the business nor its strategic goals (Basu, Jarnagin, 2008).

It is therefore necessary to examine and improve managers' attitude to understanding the benefits of adopting information and communication technologies, in different words to get managers to know the value of ICT and then to find out how this understanding and approach influence the real state of implementation of information

and communication technologies directly related to investments in ICT (Vargo, Maglio, Akaka, 2008; Ekuobase, 2013). Impact of information and communication technologies on business performance and productivity can be seen according to Brynjolfsson and Hitt (2000) in a wider context, which means that the positive economic impacts of ICT use can be achieved by combining investment in ICT with another combination of additional investment in work skills, reconstruction of business processes, and human capital. The aim of the contribution is to verify the consideration of the factors that make effective use of information and communication technologies in the implementation and use of ICT, to identify the impact of ICT on performance and on the sustainable position of service enterprises.

2. Literature Review

Factors of efficient use of ICT in service enterprises. Factors, which bring effective impacts in the production of service enterprises enabled by ICT have been addressed by several authors. For example, Raisinghani (2004) identified four critical factors for the efficient use of information technologies, such as the ability of a enterprise to quantify the benefits of information technology, collect, organize and evaluate information, understand the importance of people who work with information technologies, recognize their usefulness, and invest in qualification training and education for skilled employees in the field of information technologies for future benefit.

The heterogeneity of the service sector and the specific nature of services require consideration of other factors in the introduction of ICT. As Burgess (2002) states, each enterprise must consider the supply and the direction of its production and therefore the sectoral approach in the implementation of ICT. For this reason, a enterprise must also take its portfolios into consideration in the situations when choosing suitable ICTs, otherwise the implementation of information technologies may be ineffective. Martiško (2003) stresses that the information system is improving at the same time as the enterprise. For its healthy development, it is important to take into account not only the sectoral factor but also the factor of attractiveness of the region within which the enterprise operates and the business scope factor. According to Earl (2003) by introducing appropriate information technologies a enterprise can accomplish a successful achievement of its goals.

Koellinger (2006), based on analyzes in the eBusiness watch study initiated by the European Commission, confirmed the hypothesis that the positive impact of ICT on productivity is most visible in enterprises with more advanced ICT and with technologies implemented in all or several business processes that are compatible with each other. Aldhmour, Shannak (2009), highlighted the importance of using advanced information technologies to improve the services offered and to improve the efficiency of the costs spent on producing services. Authors examined the relationship between information technologies and competitive advantage, concluding that this relationship is positive. However, it is necessary to measure a competitive advantage in reference to the enterprise's profitability, its market share and customer satisfaction itself.

For the purpose of using new business technologies, it is necessary to innovate organizational processes as well as the enterprise's technological infrastructure with the aim of complex process optimization (Dedrick, Kraemer, 1998). Information technology has the position of a certain catalyst for a number of changes in the enterprise. There is a need to increase both the knowledge and the appropriate workers education in ICT skills. As Holland and Light (1999) state, business process optimization is important not only in the implementation of basic information technologies but also in more advanced ones. In order to successfully use advanced information systems, existing business processes need to be analyzed properly. Based on this analysis the compatibility of ICT with a given business process and the changes that need to be made in business processes can be defined (Scheer, Habermann, 2000). Smith, Chaffey (2002) also consider it necessary to adapt business processes to the use of ICT, as is also suggested by Pride, Ferrel (2006).

In addition to changes in business processes and investments in ICT, the skills of a qualified ICT workforce are also relevant in ICT implementation. Other authors as Delina, Vajda (2009), Greenwood (1998), Powell (1997), Brynjolfsson, Hitt (2003) agree with the statement. They place a skilled workforce in the foreground, but as well emphasize the importance of changes in business processes and corporate culture. They are convinced that effective use of ICT is conditional on other related changes. A similar opinion is also presented by Drake-Brockman, McCredie (2011), who consider a skilled workforce as a key factor in the effective use of ICT. They add that the training of the workforce for the enterprise is expensive, which can be reflected in the increased costs of the enterprise. Trainor et al. (2010) also emphasize that human resources play the most important role in the ICT introduction as they directly affect the performance of the business itself.

Several authors, in connection with the implementation of information technology, considered it important to examine the satisfaction of the employees themselves. The reason is that the introduction of ICT into service enterprises is also linked to the requirements placed on employees and their technical skills. Colombier et al. (2007) have shown that employees regard the deployment of ICT as positive for enterprises, appreciating in particular time saved and faster and better communication not only internal but also external.

Information and communication technologies are an area that is constantly changing, evolving and requires a lot of investment (Kubičková at al., 2015). However, the use of information and communication technologies, which are improving at a rapid pace, allows to increase business performance and improve business processes and services. The dominance of small and medium-sized enterprises in the service sector and their investment sub-dimensionality appear to be the biggest barrier for the deployment of more advanced ICT. Reducing or dividing the costs of a small business to secure ICT allows to form electronic partnerships, relationships and networks. In addition, these offer more opportunities to acquire a new market, a new order that the service enterprise could not obtain independently.

The focus of business activities on the core of their business, the efforts of enterprises to use external resources while providing supportive business processes as well as the effort to purchase only ICT services, result in an increasing use of ICT outsourcing. Sparrow (2003) highlights the high interest of enterprises in ICT outsourcing, as enterprises have understood that ICT innovation in their own set up has been disadvantageous for them due to constant upgrading and development in the field of information technology. Enterprises do not have the ability to innovate technology as quickly as specialized professionals and, above all, not in such a quality.

Many authors (Lesjak, Lynn, 2000; Gilley, Rasheed, 2000; Claver, Gonzáles et al., 2002, Kamayabi, Devi, 2011 and others) conducted studies on the impact of outsourcing on business processes. Lesjak and Lynn (2000) showed that information technology is most used in enterprises that see innovation as a source of competitiveness. Gilley and Rasheed (2000) tried to detect the impact of ICT outsourcing on enterprise performance in their study. Their research pointed out that there is no direct dependence of these two variables. This relationship is influenced by the chosen business strategy in the great degree. Other authors, Devi, Kamayabi (2011), on the other hand showed the positive impact of outsourcing on the enterprises' performance in small and medium-sized enterprises. Outsourcing of information and communication technologies enables enterprises to leave the full control of ICT in the hands of professionals. This way enterprises eliminate problems related to unskilled use of technology and therefore have the opportunity to fully focus on the core activity of their enterprise.

Based on the opinions of researchers, it can be stated that by appropriate implementation of information technology, enterprises become competitive, as ICT connects the enterprise with the market, mediates competition and market knowledge, optimizes business processes, supports faster business response to market changes, and others. However, it is important for ICT implementation to take into account those factors and effects which help to distinguish the enterprise from competition. In addition, it is necessary to consider the

specific nature of services and the heterogeneity of the service sector. According to the knowledge base of the subject issue, it is possible to identify factors of effective use of ICT in services as follow: *quantification of the contribution of information technologies; respect for the sectoral approach; introduction of more advanced information technologies or systems; change of business processes in line with the introduction of ICT; skills of a qualified workforce in the ICT field; forming of electronic partnerships, relationships and networks; use of ICT outsourcing.*

3. Methods

The chosen methodological apparatus respects the stated goal and the scientific intention of the contribution. The analysis and synthesis method is applied in identifying factors for the efficient use of ICT in services, due to the qualitative nature of the research the method of induction is applied continuously throughout the practical part, and to determine the impact of ICT on performances and on the internal and external environment of service enterprises. Testing of factors for the efficient use of ICT was realized through a questionnaire. We used mathematical methods of statistics, regression and correlation analysis and other mathematical methods to measure the impact of ICT on enterprise performance. We performed the analysis in Microsoft Excel and UNISTAT software. The descriptive and analytical (inferential) statistics were used to evaluate data and interpret the results.

The questionnaire survey was carried out by random selection of the research sample formed by Slovakia's enterprises in the market services sector (Economic activities of market services categorized into NACE sections Rev. 2: G - Wholesale and retail, H – Transport and storage, I – Accommodation and catering services, J – Information and communication, K – Financial and insurance services, L – Real estate activities, M - Scientific and technical activities N - Administrative and support services. Market services include all services that may be the subject of sales and purchases at market for a price and for which there is demand. Non-market services are not produced for commercial purposes and their production is not organized on a market-based basis. Market services include those services which resources are mainly formed by sales (Michalová et al., 2013). We contacted 1400 respondents, from whom we recovered 160 questionnaires, i. e. 11.43% return. Questionnaire survey was realized in months November – December 2017. Respondents had only one option for each question: 1 = definitely not, 2 = no, 3 = neutral, 4 = yes, 5 = definitely yes. The observed period includes the years 2011-2017.

Table 1. Number of participating enterprises by NACE Rev. 2

Sections according to NACE Rev. 2	Number of enterprises
G	14
H	23
I	23
J	26
K	8
L	13
M	33
N	20
Total	160

Source: Personal collection, 2018

The application of the sectoral approach to the use of ICT by service enterprises was realized by sorting the enterprises according to the direction of their production: to the end consumer (B2C), to intermediate consumption (B2C), to intermediate consumption and to final consumers (B2B and B2C).

Table 2. Direction of production of service enterprises

	Absolute frequency (n)	Relative frequency (%)
B2B	53	33,13
B2C	62	38,75
B2B a B2C	45	28,13
Total	160	100

Source: Personal collection, 2018

The relationship between the use of ICT and the enterprise's performance was identified with the help of the Pearson correlation coefficient (r) and the determinant coefficient (r^2), and a graph of dependencies was used to illustrate the results. We determine this dependency on the basis of the correlation coefficient. For the performance indicator we chose the sales of service enterprises that are in the position of dependent variable (y) and the individual ICT systems stand out as independent variables (x). Quantification of the extent of the use of individual ICTs in service enterprises (number of enterprises using ICT) was identified as ICT: mobility, cloud, social media, sophisticated website (websites with extended functionality), on-line sales and online purchasing (business electronic transactions), ERP, CRM; here:

Mobility – mobile employee access to enterprise information systems also while being off-premises. Such an approach, for example, saves time for employees, helps generate tailor-made customer service, supports communication, sales, logistics, enables new business models;

Cloud – providing services stored on virtual servers on the Internet. It is a technology that allows to share files between users' devices or between multiple users. The cloud service offer is very broad, the goal is to free a user from IT management starting from infrastructure through application, information and ending in processes;

Social media – communication with more customers who formulate requirements, services, and service ratings. When recorded and analyzed in an enterprise system, they can effectively, unprecedentedly and positively influence the marketing, sales and services of the enterprise;

ERP – business system for enterprise activities supported by a multi-modular application that helps enterprises manage activities such as planning, purchasing, inventory, supply relationships, customer service, order tracking, etc. ERP can also include modules for a enterprise's economic system and human resources management. It is integrated with the appropriate enterprise database system;

CRM – a system that mediates the creation, improvement and maintenance of customer relationships. It is an integrated information system that provides customer information, analysis of this information, and transformation into customer knowledge, leading to the creation of an individual offering that increases customer benefits and, at the same time, increases the efficiency of the enterprise's production).

We formulated three questions in the process of verifying the acceptance of factors for the effective use of ICT in the implementation and use of ICT in service enterprises.

RQ 1 Which advanced ICTs were used by service enterprises according to the direction of their production in 2011-2017 in Slovakia?

RQ 2 How did the use of ICT influence the turnover in service enterprises according to production trends in 2011-2017 in Slovakia?

RQ 3 Did the introduction and use of ICT affect internal and external environment in service enterprises in 2011-2017 in Slovakia?

In RQ1 we tested factors of industry approach; introduction of more advanced information technologies or systems, and in RQ2 we quantified the benefits of ICT and their impact on business turnovers. In the RQ3 we investigated the impact of ICT deployment on the internal environment (factors of business process change in line with ICT deployment, skills of ICT qualified force) and on the external environment (creation of electronic partnerships, relationships and networks, use of ICT outsourcing).

4. Results and discussion

RQ 1 Which advanced ICTs were used by service enterprises according to direction of their production in 2011-2017 in Slovakia?

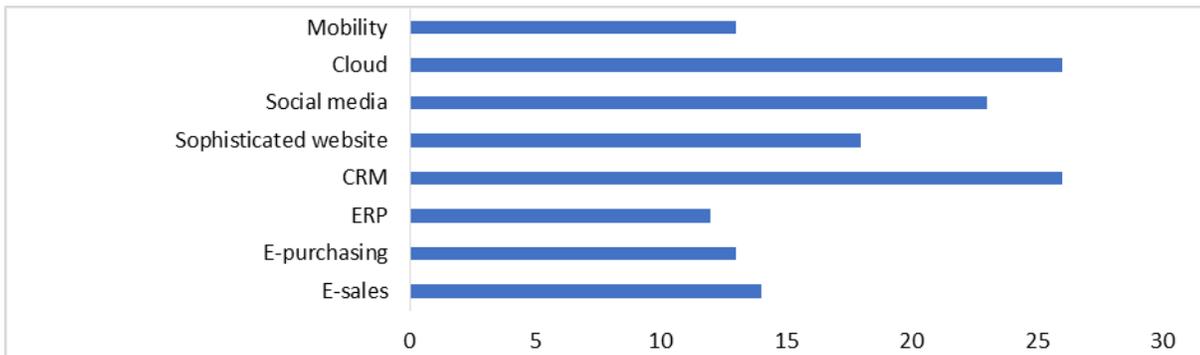


Fig.1. Use of ICT by B2B service enterprises
 Source: Personal collection, 2018

Enterprises targeting intermediate production (Chart 1) are mostly using cloud and CRM systems. The least used are business transaction technologies and enterprise resource planning (ERP systems). In reference to results it is apparent that B2B enterprises use primary systems to support internal processes. This fact results from the direction of their production. Outputs are directed at enterprises, their production is characterized by a high degree of specialization and is based on knowledge and on the creation of new knowledge. The activities of advisory services, technical, information and other professional services requiring co-operation and teamwork between employees and clients, are also included. The online sale and purchase of B2B business' service production is therefore limited.

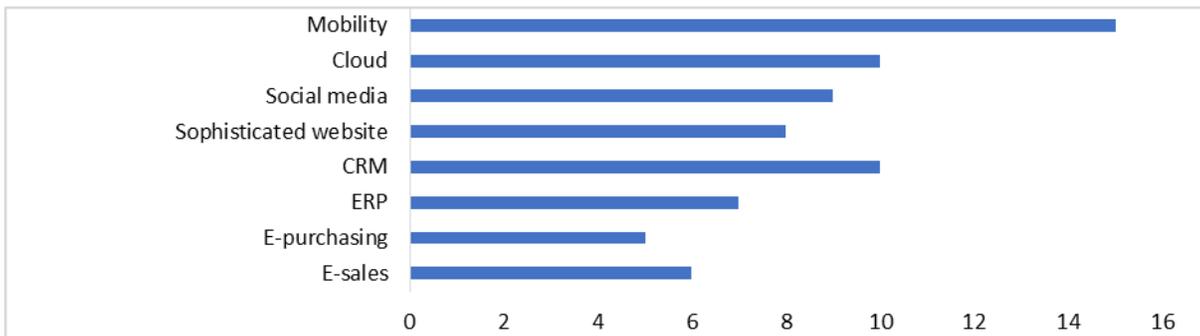


Fig.2. Use of ICT by B2C service enterprises
 Source: Personal collection, 2018

The most used technology of enterprises, the overwhelming majority of which is directed towards the end consumer, is mobility. Customer interconnection, tailor-made customization, customer information, and employee access to enterprise information system data from any location are key to B2C business. The results show that the surveyed enterprises take into account the verified factors of sectoral approach and the introduction of more advanced IT technologies in the implementation and use of ICT.

RQ 2 How did the use of ICT influence the turnover in service enterprises according to production trends in 2011-2017 in Slovakia?

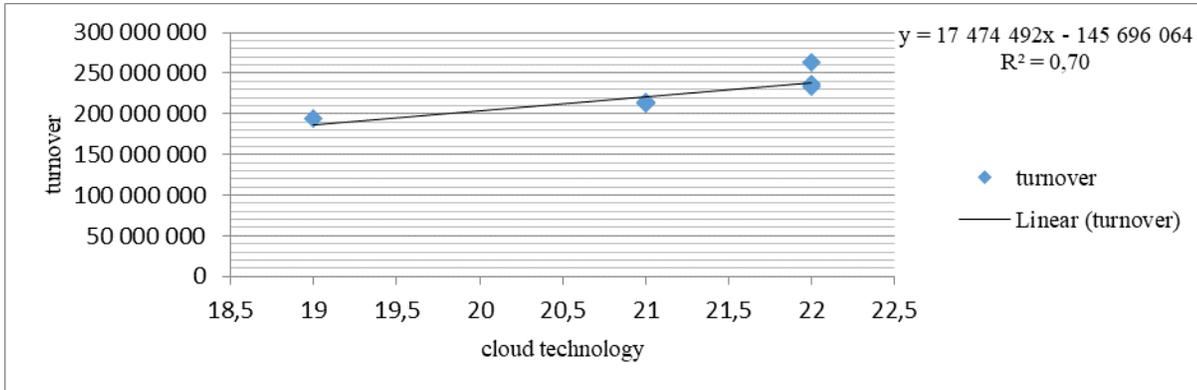


Fig.3. The relationship between cloud technology use and the turnover in B2B enterprises *Source:* Personal collection, 2018

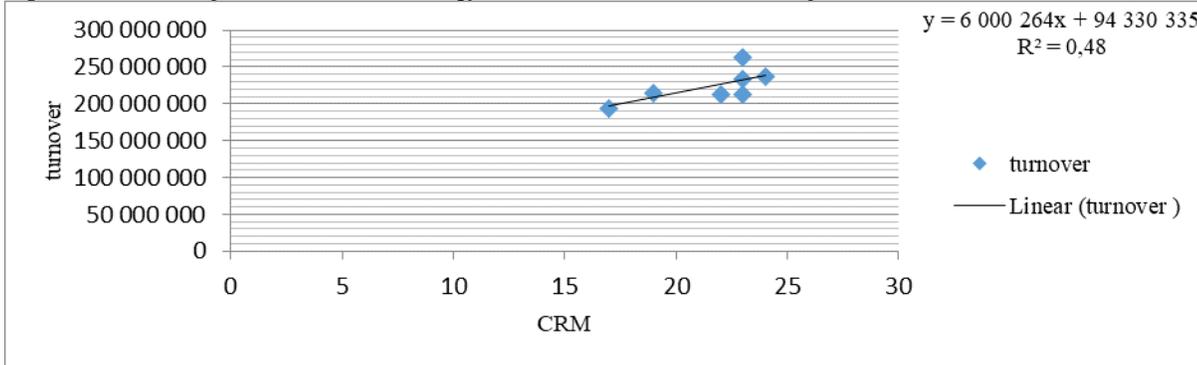


Fig.4. Relationship between CRM use and the turnover in B2B enterprises *Source:* Personal collection, 2018

Table 3. Results of the correlation and regression model

Direction of production	ICT	Correlation coefficient	Determination factor	Significance F (p-value)
B2B	Cloud	0,83	0,70	0,018
	CRM	0,69	0,48	0,084

Source: Personal collection, 2018

The results of the correlation and regression analysis confirmed a very high linear dependence between the use of cloud technologies and turnovers. This means that if the number of enterprises using the cloud grows, B2B turnovers also grow. The regression model explains up to 70% of data variability, the remainder is caused by deterministic factors that are not included in the model and by random effects. The model is statistically significant (0.018) at the significance level $\alpha = 0.1$.

Also, the relationship between the use of CRM and B2B enterprises shows a large direct linear dependence. The growth of CRM enterprises positively affects turnover growth, the model explains 48% of data variability. The model is statistically significant.

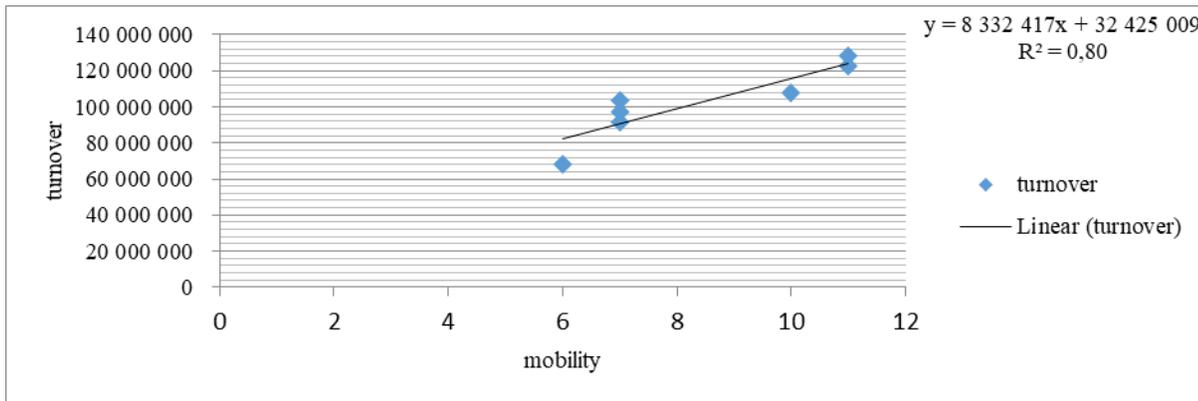


Fig.5. The relationship between mobility use and the turnover in B2C enterprises *Source:* Personal collection, 2018

Table 4. Results of the correlation and regression model

Direction of production	ICT	Correlation coefficient	Determination factor	Significance F (p-value)
B2C	mobility	0,89	0,80	0,006

Source: Personal collection, 2018

An almost perfect linear relationship was demonstrated between the use of mobility and the turnovers of B2C business enterprises. Correlation analysis proves that the growth in the number of mobility using enterprises has a positive effect on the growth of B2C turnovers. The determination factor confirms that 80% of the data is explained by the model, the remained is caused by other factors and by random effects. The model is statistically significant.

RQ 3 Did the introduction and use of ICT affect internal and external environment in service enterprises in 2011-2017 in Slovakia?

Table 5. The impact of ICT on internal and external business environment

INTERNAL ENVIROMENT					
<i>Change of business processes in line with established ICT</i>					
Has the use of ICT optimized the processes of your enterprise?	7	10	20	88	33
Has the use of ICT accelerated the processes of your enterprise?	6	8	12	104	29
Has the use of ICT clarified the processes of your enterprise?	4	11	12	111	20
Has the use of ICT secured the materials for efficient decision-making in your enterprise?	4	24	18	99	13
<i>The skills of qualified workforce in the field of ICT</i>					
Has the use of ICT affected the qualification requirements of your employees in ICT skills?	3	46	31	71	7
Have your employees adapted to the functionality of ICT?	1	15	24	115	3
Has the use of ICT required training and retraining of your employees?	4	59	31	61	5

EXTERNAL ENVIROMENT					
<i>Forming of electronic partnerships, relationships and networks</i>					
Does the use of ICT enable a collaboration with your business partners?	1	20	23	107	7
Does the use of ICT participate on the improvement of the interaction with costumer?	0	11	14	110	23
Does the use of ICT enable interconnection of the enterprise's internal and external environment?	3	26	30	94	5
<i>Use of outsourcing ICT</i>					
To what extend does your enterprise use external ICT?	22	34	40	56	6

Source: Personal collection, 2018

Most of the surveyed enterprises confirmed the effects of optimization, transparency and acceleration of business processes through the introduction of ICT. It means that enterprises were able to change their processes in line with established ICTs. It brought them positive changes and innovation of process leading to more effective management decision-making.

Most enterprises declared effective employees' adaptation to the functionality of established ICTs, demonstrating that service employees have ICT skills and are well-qualified, and flexible to adapt to change in business. This is also confirmed by other respondents' replies, as only a third of enterprises declare the need for requalification and further training of their ICT employees. This means that enterprises take into account the factor of a skilled workforce in the field of ICT when choosing their employees.

Creating electronic relationships and networks with partner organizations, collaboration with customers and employees are both another effect of using ICT. This was confirmed by the most of the enterprises. Service enterprises are aware of the need to link the internal and external environments, the need to obtain information about customer in the terms of creating or improving an existing product, and the need to build partnerships for the purpose of the new business opportunity on the market.

The use of outsourcing and passing the governance of ICT to professionals, so the enterprises were able to concentrate on their core activity, didn't particularly succeed among the surveyed enterprises. Only half of enterprises use the services of external ICT service providers.

Conclusions

The survey results show that the surveyed enterprises take into account the factors of sectoral approach and the introduction of more advanced IT technologies in the implementation and use of ICT. The most used technologies by B2C and B2C effectively influence business performance as measured by their turnover. The positive influence of ICT on the internal and external environment of Slovak service enterprises was also confirmed. The verified factors of efficient use of ICT were accepted and implemented by enterprises in the survey. Therefore, it can be said that the identified factors bring effective impact on the production of services. Their implementation contributes to the sustainable growth and position of Slovak enterprises in the service market.

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CONTENT OF A INTRA GROUP COMPLIANCE AGREEMENT AS A RISK MITIGATING FACTOR*

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Abstract. The contribution deals with the topic of relationship between the mother company and the daughter company, specifically how to set up, control and verify the compliance rules in the daughters company acc the standards important for the mother company. Current legal and managerial environment require to implement the same level as applied by the mother company not only to protect its shares in the subsidiaries but more likely to create a shelter and mitigate possible risk for the conduct of its subsidiary in its country, culture and environment. The contribution shows the possibility to implement the compliance rules and the compliance managemtn systemof the mother company in the daughter company through the so-called intragroup agreement as a frame to set up a correct control, reporting, consequence management in the daughter company. It also draws a line how the compliance should be taken in the subsidiary in relation to the position of created compliance office, that needs to be stablished and manged in the separate line stream form the line management to ensure its independence. The authors show the relevance of this model also by particular decision of the legal practice, mainly quoting plea bargaining of the accused legal persons from corruption or moneylaundering conducts.

Keywords: compliance; effectiveness; criminal responsibility; post-acquisition; SPV; sanctions; vulnerability; mother-company; daughter-company; intra group relations.

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JEL Classifications: M14, M16

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1. Introduction

This article follows an article *Intra Group Compliance Agreement as a tool to manage the risks in the daughter companies* (Kurilovská, Kordík, 2018) to give a deeper analysis on the content of the Intragroup compliance relationship in particular what are the roles and functions of the mother company that is requesting the implementation of the compliance management system and the daughter company that is requested to cooperate (Reitzel, 1990, p.225).

Ethics & Compliance and Law Violations may be defined as serious illegal or unethical behavior, violations of civil or criminal law, or company' Code of Conduct or related policies, or other significant misconduct. Examples include but are not limited to actual or threatened physical violence, theft, intentional or reckless fraud, corruption, bribery, kickbacks, conflicts of interest, accounting irregularities, misleading accounting personnel or internal or external auditors, interfering with or obstructing internal investigations, discrimination, harassment, circumvention of internal controls, disclosing confidential information, breach of customer or employee privacy, falsification of company records (including expense reports), violation of accounting policies, unauthorized or undisclosed commitments, side letters, violation of import/export regulations, abuse of company resources, etc. Whether an act of alleged misconduct constitutes a potential Ethics & Compliance and Law Violation will be determined by the findings of the company (Statement of offense Siemens AG v. USDOJ, 2013, para 33-35). All credible and actionable allegations of Ethics & Compliance and Law Violations in the corporations need to be taken seriously and need to be investigated in a professional, competent, fair, objective, impartial, confidential, lawful and timely manner (Anderson, Grey 2006, p.105).

Depending on applicable law, and in consultation with workers' representatives (where applicable), this may include such things as: (Statement of offense Siemens AG v. USDOJ, 2013, para 36-61).

- keeping confidential the fact and subject of the investigation, as well as information, documents or other evidence provided to Company Investigators;
- responding truthfully, accurately and completely to questions from Company Investigators;
- thoroughly and timely complying with requests from Company Investigators for email, documents and other evidence; preserving emails, documents and other evidence that may be relevant to the investigation;
- turning over and/or providing access to company-provided workspaces, computers, communication devices, desks, filing cabinets, and other company-provided equipment or property; and
- if necessary and warranted under the circumstances, and permitted under local law, providing reasonable access to personal property and documents brought onto company premises or stored on company-provided computers or other devices.
- to search, inspect, and monitor company-provided resources including buildings, workspaces, vehicles, desks, filing cabinets, company-provided information and technology resources (such as computers and communications devices), and other company-provided equipment or property, and to access, intercept, copy, review, disclose and delete any communications, files, websites or data access, send, receive, create or maintain with or in company resources.

From the above mentioned it is evident, that the compliance and corporate investigation in particular is a complex process consisted of a legal, organizational, HR and informational puzzles. It is even more complicated if the corporation needs to/is willing to establish the compliance management system and corporate investigation in its subsidiaries and to cascade the whole system a level below. To create an effective and vivid compliance management system it is essential to establish the information exchange and flow from the subsidiary towards the Mother Company and *vice-versa*. (Plea agreement, Kellogg, Brown, Root, LLC. V. USDOJ, 2011, para. 25) One possibility how to reach it, is to establish the cooperation through the so-called Intra Group Compliance

Agreement (further as “IGCA”). Its content, purpose and characteristics is provided bellow. (Statement of Offense, Siemens AG v. USDOJ, 2013, para 8-9).

2. Services provided by the Mother Company without the subsidiary request

The Mother Company shall provide the following services without a separate call-off by the subsidiary in the design and operation of its compliance organization.

- whistle-blower system;
- Inquiries and Investigations
- Reporting and Monitoring
- Compliance Risk Analyses
- Training
- Advices, Inquiries and investigations
- A subsidiary duty to cooperate
- Right of codetermination
- Data protection and the transfer of personal data.

3. Mother Company whistle-blower system

The Company needs to hear about suspected Ethics & Compliance and Law Violations involving employees, employees of any subsidiary, contingent workers, or third parties performing services on company behalf. (Statement of Offense, Siemens AG v. USDOJ, 2013, para 86) To that end, if the whistle-blower suspects that any company employee, contingent worker or third party performing services on company’ behalf is or maybe engaging in an Ethics & Compliance and Law Violation, the company should strongly encouraged and, depending on the role and country, may be required, to bring these concerns to the company (Statement of Offense SIEMENS AG v. USDOJ, 2013, para 74).

On the other hand, one shall not make the false reports or use the reporting process for inappropriate purposes, such as to harass, slander or humiliate others, or to interfere with or obstruct an internal investigation. Reports should be based on a sincere concern that an Ethics & Compliance, Law Violation or other misconduct may have occurred and should not be based on prejudice or mere speculation. Even good faith reports must be made confidentially and by appropriate means. This is to protect the integrity of the process and the reputations of the accused and others involved in the investigation who are entitled to be treated fairly and with dignity and respect. It is not appropriate to widely disseminate allegations internally or externally via broadcast emails or other disruptive means. Individuals who knowingly make false reports or who misuse the reporting process by making reports for inappropriate purposes or by using inappropriate means, need to be subject to the discipline and other consequences provisions. However, any individual who makes a good faith report of suspected misconduct (i.e., a report that he or she reasonably believes to be true) will not be subject to discipline or other consequences even if the underlying concern turns out to be unfounded or could not be substantiated after investigation (Resource Guide to the FCPA, 2012, p. 82).

If the Mother Company operates a whistleblowing system (usually a mailbox, hotline, the employees should use the means, which are the most comfortable), it should be agreed in the IGCA that the tip-offs can be submitted at any time and the whistleblower’s anonymity is technically maintained (if desired in the individual case); information is treated as confidential.

If the tip-offs are not related to compliance violations of relevance to the Group, but related to the Mother Company, it should be agreed the Mother Company shall according the IGCA forward them to the subsidiary after subjecting them to a plausibility check (US Sentencing Commission Guideline Manual, 2014, Part 8B2.1).

If no action is taken or if there is a conflict of interest, the tip-offs shall be directed to the member of the subsidiary's management responsible for compliance. The subsidiary reports the results, including meaningful and verifiable documentation, in accordance with the IGCA to the Mother Company after final processing of the tip-off at the latest. The subsidiary should also submit interim reports on request (Reitzel, 1990, p. 342-343).

3.1. Reporting and Monitoring

The Mother Company should have the possibility acc. the IGCA to address its own findings and recommendations for action to subsidiary's management or the bodies, committees or persons legally responsible for its supervision, provided that the Mother Company deems this action to be necessary in the individual situation. With regard to the monitoring of success stated above as well the results arising from the investigations in the cases of the Group relevance cases on the other hand, the Mother Company has a duty to report. The Mother Company shall report results of success monitoring, inquiries or any other situations requiring a decision by the subsidiary management or Supervisory Board to the member of subsidiary's management responsible for compliance.

If the responsible member of the Management fails to take action or has a conflict of interest, the IGCA should state the Mother Company shall direct its reports to all subsidiary managers with the exception of the member of the Management who has the conflict of interest. The Mother Company shall also be entitled to involve the subsidiary's Supervisory Board. If the Management as a whole fails to take action or has a conflict of interest according the IGCA the Mother Company shall direct its report to the appropriate supervisory body or its responsible committee members (e.g., Chairman of the Supervisory Board, General and Audit Committee of the Supervisory Board).

The Mother Company shall furthermore be entitled pursuant the IGCA to submit periodic reports directly to the Management as well as to the supervisory body or its committees at any time. (Turayová, Tobiašová, 2014, p.82) To assist subsidiary's management in meeting its responsibilities in compliance matters and to ensure a uniformly high standard of compliance throughout the Group, the IGCA shall anticipate the Mother Company shall, at its own discretion, regularly check the operational implementation, suitability, completeness and effectiveness of the measures taken in operating the compliance management system of the subsidiary and in implementing the compliance program in the subsidiary (Anderson, Gray, 2006, p.105).

In line with the domestic law the Mother Company a comprehensive right to information. In doing this, the Mother Company shall be acc. the IGCA able to submit petitions to the subsidiary, either alone or – to the extent permitted by law – together with third parties it has engaged (e.g., attorneys-at-law, auditors) or other corporate departments of the Mother Company for the inspection of or request for information of any type whatsoever and to obtain information locally or by way of remote access. The Mother Company will grant that each submitted request for information will be in the line with its law and its Code of Conduct. The Mother Company should take full liability for any potential breach of its law by submitting such a request. The Mother Company access to its own information for this purpose, regardless of the format and systems used, as well as a direct right to ask questions of and receive answers from subsidiary's management and all employees of the subsidiary. Subsidiary's management according the IGCA shall support these measures and instruct its employees to cooperate with the Mother Company (Fenyk, Smejkal, 2012, p. 45).

IGCA should include the provisions related to the subsidiary obligation to prepare a compliance report which provides information on compliance violations within the subsidiary which meet the aforementioned criteria of a

relevance offended in particular period of time.. In addition it should be established that the report should include a description of the case, information shall also be provided on the latest status of the measures taken.

If the Mother Company is at risk of incurring significant tangible or intangible damage, an ad hoc report shall be prepared.

The compliance report shall also contain statistics/KPIs and information on ways to enhance the Compliance Management System. (McCarthy, Bagby, 1990, p. 790)

Nevertheless the Mother Company should grant to the subsidiary employees and management all the rights to which they are entitled by the domestic law and collective labor agreement (if applied) mainly, but not limited to, the right to privacy, data protection and equal treatment. The Mother Company should grant the right to the employee deny to answer if such an answer could lead to the breach of commercial secret, telecommunication secret, bank secret, tax or duty secret. The Mother Company should not deny the right to the employee to deny to answer if the subject of the answer is considered confidential. If the prior consent of the third party or touched person is needed for the reveal of the information, the Mother Company, as anticipated in the IGCA grants the right to the employee to dismiss such a request if the consent has not been given. In the line with the IGCA the Mother Company shall grant to the employee to dismiss the answer, if it could lead to self- incrimination.

3.2. Advices, Inquiries and Investigations

It is worthy to establish that the subsidiary may request the support services as needed by submitting a request to the Mother company. IGCA should provision to the extent permitted by law and justifiable in fact, that the Mother Company shall support COMPANY as needed during the course of inquiries and investigations into possible compliance violations on the basis of corresponding reports or request on the part of the subsidiary which do not reach the threshold of “Group relevance” as defined.

If the subsidiary would like to use the corresponding expertise and resources of the Mother Company in conducting inquiries and investigations, and if the Mother Company is able to provide support, the IGCA should address the Mother Company shall be responsible for determining the type and scope of the services to be provided. The subsidiary shall be involved in the procedure at an early point. If the investigations are to be conducted with the involvement of third parties, the Parties shall initiate an appropriate engagement procedure and adhere to the applicable processes (Muller, Kalin, Goldsworth, 2007, p.813).

The Parties shall subsequently jointly work out the specific design of these services following submission of the request. (Aplikace §8 ods. 5, 2016) Depending on the type of misconduct being investigated, the Mother company may assign usually subject matter experts from e.g. Human Resources, Security, Legal, Finance, Corporate Audit, Information Security teams, to serve as Company Investigators or to assist the company investigators.

It should be stated, that in the event of justified initial suspicion of possible compliance violations within the subsidiary which have reached the threshold of Group relevance anticipated in the IGCA, the subsidiary shall facilitate and support the inquiries to be conducted by the Mother Company or by third parties it has engaged. The IGCA should address following situations shall be viewed as relevant for the Group: (US Sentencing Commission Guideline Manual, 2014, Part 8B2.1)

- Compliance violations in which a member of an executive body (Board of Management, managing directors, Supervisory Board) or the first or second reporting level is involved;
- Financial reporting or auditing of financial statements is affected;
- There is a risk of significant tangible or intangible damage;
- The damage exceeds particular thresholds in Euro; or
- Events deemed to be of relevance to the Group Board of Management, the board member responsible for Data Privacy, Legal Affairs and Compliance at The Mother Company or the COO.

For the purpose of conducting such inquiries, the subsidiary grants the Mother Company the rights for the information. The subsidiary will grant that it actively pursue all tip-offs of compliance violations and – if these are of relevance to the Group – submit them to the Mother company, along with meaningful and verifiable documentation acc. the IGCA. As stipulated in the IGCA the Mother Company grants its subsidiary that the Mother Company will be performed to the extent limited by the domestic law and can be conducted only in the line with the law. It is wise to provision that in the case of dispute, the subsidiary will provide the Mother Company with detail binding inquiry guidelines that shall not be exceeded. (Mac Adams, 1989, p. 891)

Based on mutual trust established by the IGCA, the subsidiary will grant the Mother Company that every executed request for information will be fully in the line with the domestic law and Code of Conduct. The IGCA should state that the subsidiary will take full responsibility for any potential breach of domestic law.

The Mother Company grants to provide the subsidiary detailed service level agreement (further mentioned as “SLA”) about the, terms but not limited to:

- facilitation and support process of the Mother Company inquiry;
- justified initial suspicion;
- Events deemed to be of relevance to the Group Board of Management, the board member responsible for Data Privacy, Legal Affairs and Compliance at Mother Company or the COO. (Stessens, 2002, p.460)

The IGCA should also include the advisory lines and the possibility to ask for the opinion if needed. The Mother Company should operate a central consultation desk for providing personal advice to employees on compliance matters, which serves as a central portal for subject areas defined by the Mother Company..

Since the subsidiary operates its own consultation desk (if applicable), the Mother Company should grant to provide information as needed on the methodology and infrastructure for operating a portal of this type.

3.3. Compliance Risk Analyses

The IGCA should incorporate that Mother Company shall provide its subsidiary with advice and support in preparing a so-called Compliance Risk Analyses for evaluating its company-specific compliance risks and developing the company compliance program. For this purpose, the Mother Company shall describe the methodology, roles and responsibilities for compliance risk assessment and, in addition, provide overviews, checklists and reports on the experience of other companies which are comparable to the subsidiary. The Mother Company shall in the line with the IGCA subject the results to a plausibility check. The subsidiary shall grant to implement the recommendations derived therefrom on its own responsibility and as it sees fit. (Statement of Ofense Siemens AG v. USDOJ, 2013, para 74)

3.4. Training

The IGCA should emphasize the role of the education. It should be stated the Mother Company shall advise and support the subsidiary in carrying out the training it is responsible for providing to its managers and employees. It is worthy to anticipate, only those individuals who have been trained on the Internal Investigation Procedures should be assigned to serve as Company Investigators in connection with an internal investigation of potential Ethics & Compliance, Law Violations. No one, including members of management, members or anyone else, should engage in internal investigatory activities relating to suspected Ethics & Compliance, Law Violations unless they have been specifically assigned by the Mother Company or by the subsidiary.

3.5. A subsidiary duty to cooperate

Within the scope of the services established in the IGCA to be provided by the Mother Company, the subsidiary shall support the Mother Company to the best of its abilities and in the line with the domestic law. The subsidiary shall establish the necessary prerequisites to enable the Mother Company to provide its services. For this purpose, the subsidiary shall, to the best of its abilities, take steps, among other things, to obtain any decisions of the executive bodies that may be needed (Management, supervisory committees or shareholders), prepare and announce instructions and guidelines for its employees, etc. (Gray, Hellman, Rytermann, 2004, p.81)

The subsidiary shall have the possibility to dismiss the cooperation if the request or ask for cooperation would lead to the breach of domestic law or the granted rights of the touched persons mainly, but not limited to the employees, business partners or third parties. The subsidiary should grant in accordance that every executed request for information is fully in the line with the domestic law and Code of the Conduct. The subsidiary shall take full responsibility for any potential breach of law (Deutscher Corporate Governance). One of the crucial point of the IGCA that needs to be addressed is the implementation of the group policies to assure the same level of compliance maturity. The Mother Company shall support its subsidiary with regard to the formal processes (e.g., need for committee decisions, implementation experience) in implementing the Mother Company policies. The IGCA should be accurate on one side in the fact that the subsidiary grants the rights to implement the Mother Company Policies in the way compatible with the domestic law and domestic business standards. Nevertheless the IGCA should as well consider that the local implementation of the Mother company policies shall not be against the primary meaning and purpose and has to follow its sense- to reach the same level of compliance maturity as achieved in the Mother Company (FATF, 40 recommendations, 2017). The IGCA should equally cover also the subsequent situation when the subsidiary is a parent company, it shall take steps within its business units (BUs) to set up, implement and operate a Compliance management system which are tailored to the individual needs of the BU concerned.

3.6. Right of codetermination

It has to be provisioned in the IGCA that the subsidiary's management shall grant the Chief Compliance Officer of the Mother Company s functional control over the Compliance Officer of the subsidiary. The Chief Compliance Officer of the Mother Company shall have the right to nominate a candidate. In the event of escalation, a decision shall be made at Board of Management level. It needs to be provisioned that a dismissal or termination of a Compliance Officer shall require the prior consent of the Chief Compliance Officer of the Mother Company in order to be effective.

3.7. Data Protection

To protect the integrity of internal investigations and the reputation and privacy of those involved, all internal investigations must be conducted confidentially. Company investigators and others involved in internal investigations should not disclose the fact or subject of, any details relating to, or the identities of accused individuals or other involved persons, except to those with a legitimate need to know based on their unique requirement to be involved in the case. All accused individuals and others involved in internal investigations must be treated fairly and with dignity and respect, in accordance with applicable law and in consultation with authorized workers' representatives (where applicable).

IGCA should incorporate a necessity to specify in the line with the data privacy legislation (law, Non-disclosure Agreements, Service Level Agreements, amendments of the labor contracts, consents oft he touched persons) if personal data is collected, processed or used during the aforementioned activities performed by the subsidiary. The IGCA should anticipate following: (US Sentencing Commission Guideline Manual, 2014, Part 8B2.1)

3.8. Data transmission.

Any information shared among the subsidiary and the Mother Company within the provisions of this agreement is to be handled as confidential and is protected from disclosure to third parties. The subsidiary and the Mother Company should take all necessary steps to protect the applicable privilege and/or confidentiality of information received from the other, including ensuring that information received is not disclosed to anyone without the authorization of the disclosing party and/or unauthorized access is prevented. The information should be used only for the purpose described hereto and the Mother Company and the subsidiary shall abstain from using it for any other purpose.

3.9. Right for the Information.

The Mother Company should grant the right to the subsidiary to inform the minor shareholders of subsidiary about the content and nature of all information provided to the Mother Company. Mother Company should grant to provide the subsidiary with the result of the conducted inquiry that shall be passed to the minor shareholders of the subsidiary together with all necessary information.

Conclusions

Like many types of contractual arrangement, often only becomes apparent when something goes wrong. In everyday company life the concerns may raise from peers or colleagues. Whenever a member of management or of the Human Resources, Legal, Security, Finance, Accounting, Audit or the various Internal Use - Confidential compliance-related functions should be notified of a potential Ethics & Compliance Violation as described above, he or she should refer it immediately to the Compliance office.

Concerns may pop up also in the course of internal processes. Potential Ethics & Compliance Violations may become apparent in the course of handling internal matters such as personnel issues, safety investigations, fraud investigations, security incidents, accounting determinations, internal audits, control self-assessments or other internal activities.

Last but not least the concerns may origin from external processes. Similarly, potential Ethics & Compliance Violations may also become apparent when responding to actual or threatened litigation, government inquiries and investigations, arbitrations or similar proceedings. When this occurs, the Compliance office should be notified immediately so the matter can be evaluated. Depending on the circumstances, the Compliance office may assume responsibility for the investigation or may partner with or defer to the team already handling the matter.

All these tip offs need to be taken seriously with respect to all relevant risks and being in compliance with all legal provisions.

Considering all these aspects, the effective compliance management system is a dance between eggs and may work only when it is set up properly and in time. On the other hand this does not necessarily mean adopting large number of robust internal policies creating a complicated administrative and reporting lines, processes, establishing cooperation and data protection agreements, e learnings etc. Even the small companies operate effective and high standard compliance management systems based on “open door policies and mutual trust” without any major internal regulations.

If one needs to draw a compliance management system from the scratch or needs to properly administrate all the informal compliance processes in the company, the introduced model of the a Intragroup Compliance Agreement may help him/her to handle the Compliance as a inherent part of the business and and to consider it as a “showstopper and troublemaker” in the company.

Further important aspect of the IGCA reflects the constant internationalization of the environment, increasing competition and for efficiency reasons, it is quite common that multinational enterprises provide different services within the group. In addition, the creation of intragroup service centers to centralize the service offering in the group has been the trend of the recent years. Thus, there is no need for group members to separately outsource different services from third parties including investigation e.g.. Usually, these services are of supportive nature, which are not directly related to the group's core business, for example HR, accounting and legal services including investigation and compliance management consulting services. Also, it is quite common that the main function of the parent company is a holding activity and offering a management service or specifically trained, educated personnel to the group members, capable to conduct investigation in discreet, impartial and professional manner.

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LABOR MARKET SECURITY IN THE LIGHT OF EXTERNAL LABOR MIGRATION: NEW THEORETICAL FINDINGS*

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Abstract: Conceptualizing the consequences of external labor migration for the development of the labor market of the receiving territory is an extremely important and relevant area for studying migration effects. It develops in parallel with the intensification of labor migration processes in the world, the expansion of the methodological tools and the information base of research. The subject of this paper is the impact of external labor migration on the labor market security. The study aims to substantiate the relevance of a new interdisciplinary approach to the study of the effects of labor migration on the host labor market, namely the analysis of risks and threats, labor market security factors in the sphere of external labor migration. The study is carried out using methods of systematization and classification, general dialectical methods. The analysis suggests that labor market security in the sphere of external labor migration can act as an independent area of research for migratory consequences in labor markets. It relies upon the findings of national security studies and the established directions for studying the impact of external labor migration on the labor market of the recipient territory.

Keywords: labor market sustainability; labor market security; international labor migration; migration effects; migration consequences; labor market; migrant workers; path dependence

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JEL Classifications: J61, F52, R23

1. Introduction

Global changes that have occurred in the last quarter of a century in the political, economic, social, and technological life of modern societies have given impetus to the unprecedented migration mobility of the population. In 2017 nearly 258 million people worldwide were involved in the international migration (i.e. people living outside their birthplace), or 3.4% of the total population of the Earth – this is the highest value in the entire history of the observations (International Migration Report 2017, 2017). Over the past 25 years, the number of international migrants has increased by more than 91 million people, or 60%. Despite the colossal growth and

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intensification of the processes of forced migration, especially in North Africa and the Middle East, about 72% of all international migrants now make people aged 20-64 years, which allow us to speak about the high labor activity and the potential of the latter.

Against the backdrop of a change in the pattern of migration mobility of the population, it is generally necessary to single out the flows of international labor migration, which are mainly influenced by the globalization of the world economy that abolishes barriers to the transfer of capital, information, and technology. The internationalization of the world economy means the transition from closed or semi-closed labor markets to the world market, which is formed and exists only through labor migration (Shchipanova, 2013). According to the latest statistical estimates of the International Labor Organization, the number of migrant workers (i.e. persons working or seeking employment in their country of residence) in the world in 2013 totaled 150.3 million people, or 64.8% of all international migrants, that is about 4.4% of the total employed population (International Labour Office, 2015).

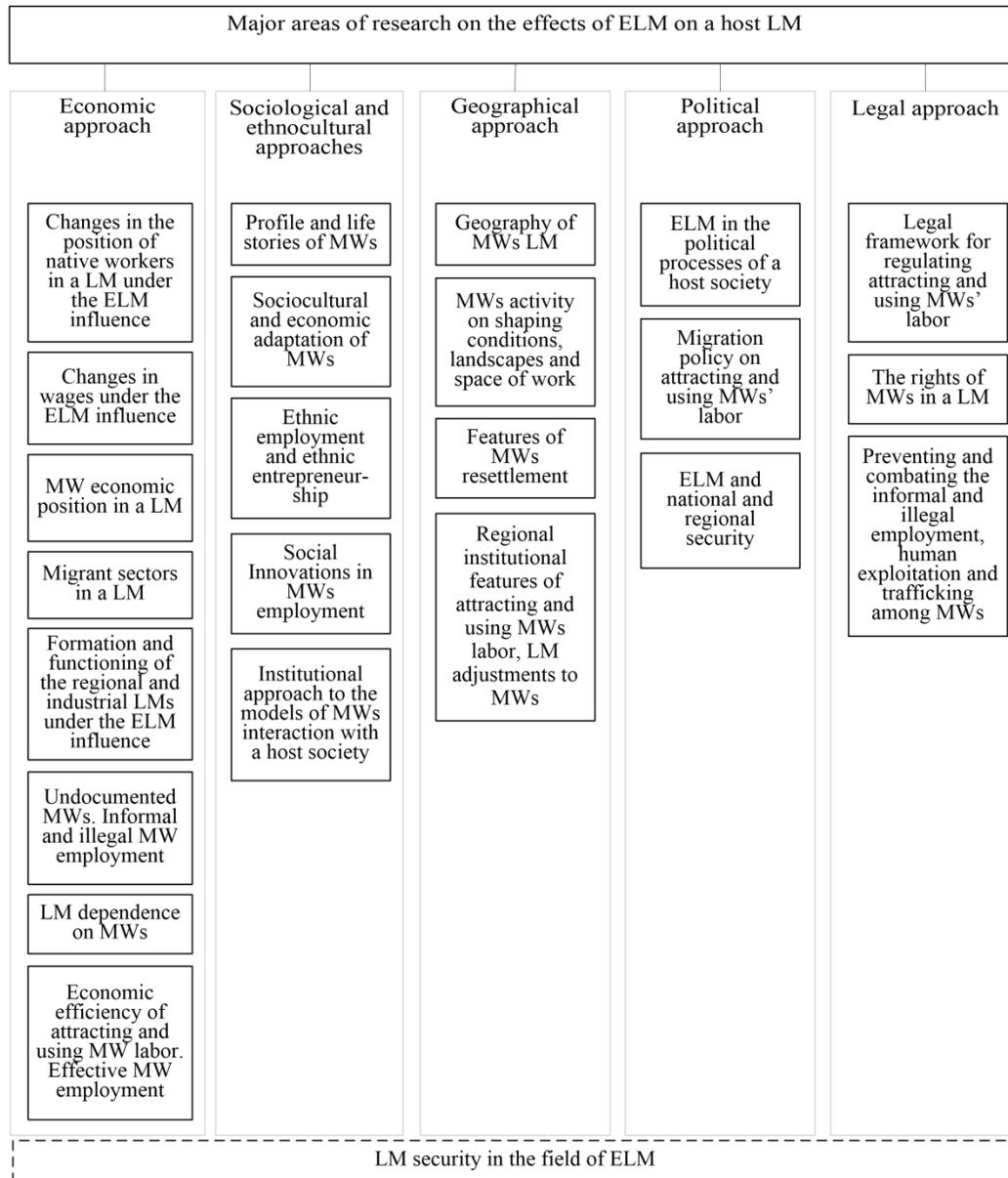
Clearly, these processes have a significant impact on the development of migrant-receiving territories. Over the past 60-70 years scientists around the world have been anxious about the power of this influence and the changes happening to the ecosystems of the host society (Lyalina, 2016). A special niche in the number of modern studies is occupied by those of them, focusing on the subject of labor market. It should be noted that today the scientific community is unanimous that any type of migration of the population influences the formation of the labor supply and the development of the host labor market; however, most of the relevant studies are aimed at studying the consequences of labor migration of the population. This is due to the economic nature of such migration, i.e. the orientation of migrants to participate in the labor market, on the one hand, and, accordingly, the need to regulate these processes with a view to the balanced and sustainable development of the labor market by the host state, on the other.

Despite the huge accumulated experience in studying these issues, the identified consequences are not systematized in the modeling of the processes occurring in the labor markets under the impact of labor migration. The economic and sociological approaches prevail in the studies, while the geography is given a secondary role. As a rule, scientists resort to purely geographic methods of research while studying the spatial features revealed and described using economic and sociological methods. Another obvious shortcoming of the existing studies is insufficient knowledge on the issues of ensuring the security of the labor market, the risks and threats, which follow the attraction and use of foreign labor. The reason for this is the lack of an established understanding of the term security of the labor market both nationally and internationally. The study is determined by the need to systematize and classify available scientific approaches to studying the impact of labor migration on the development of the labor market, generalization of the migrations consequences to labor market development in terms of the labor market security. The study aims to substantiate the new interdisciplinary scientific approach in investigating the effects of external labor migration in terms of creating risks and threats, while taking into account their geographical specifics. To do this, it is necessary to initially determine the security of the labor market in the system of national or regional security components. The study is carried out using methods of systematization and classification, general dialectical methods.

2. Approaches to studying the effects of labor migration on labor market development

The problem of assessing the impact of migration, and especially its labor component, on the development of the labor market, has been of great interest for representatives of various scientific schools: economics, sociology and ethnoculture, geography, political science, law and others. Determination of the relevant scientific publications on the topic has led to a classification of the main research areas of the study of the impact of external labor migration on the labor market of the host territory featuring 23 directions (Figure 1). The classification is based on the principle of correlating the research areas with the scientific approach, which is determined by the goals and

objectives used by the given research method. Within the framework of the classification it is proposed to formulate a new research area entitled “labor market security in the sphere of external labor migration”, which can take its position at the intersection of existing areas based on the accumulated experience. This research area is interdisciplinary and includes analysis and assessment of all possible migration consequences in terms of risks and threats, factors of the labor market security. It should be noted that the classification proposed has some limitations as it is not all-embracing (some individual aspects might be left aside) and is generalized, since a particular research area can be simultaneously considered in the framework of different approaches. The main attention is paid to economic, sociological and geographical studies.



Note: MW – migrant workers; ELM – external labor migration; LM – labor market

Fig. 1. A classification of major areas of research on the effect of external labor migration on the host labor market.

Source: Own elaboration.

In the 1960s theoretical economists pioneered research on the negative consequences of labor migration on the development of the host labor market, which is reflected in the classical and neoclassical models of the economic growth of Solow-Swan (1956) and Ramsey (1928) where migration is seen as a factor in the growth of the labor force. The main idea of the first publications on the topic was that the international movement of the labor force, as one of the factors of production, affects the rate of economic growth. In general, the inclusion of migration component as the main source of labor force in the theoretical models of economic growth of Solow-Swan and Ramsay contradicted the estimates of public authorities and demonstrated the negative impact of migration processes on economic growth including on the capital-labor ratio of the economy and labor productivity (Barro and Sala-i-Martin, 2003). Early studies suggest that the net outflow of the population is found to contribute to economic growth, a net inflow slows it due to an increase in supply in the labor market and a decrease in the efficiency of the use of fixed capital. However, later empirical studies of Barro & Sala-i-Martin (Barro and Sala-i-Martin, 2003) and Lifshits (Lifshits, 2013) proved otherwise. In particular, Livshits (Lifshits, 2013) came to the conclusion that the long-term impact of migration is usually positive or insignificant. The only exception is countries with a high level of natural reproduction of labor resources, where the negative impact of migration on economic development is possible.

Later, as the methodological tools and the database of input data were expanded, scientists proposed a number of research areas in this subject: the study of the consequences of competition among workers from the local and newly arrived population (taking into account their professional heterogeneity) for the position of local workers in the labor market and their remuneration (Borjas, 2003; Angrist and Kugler, 2001; Kugler and Yuksel, 2008; Škuflić et al., 2018); economic situation of the legalized (Chiswick & Hurst, 1998; Borjas, 1987) and unlegalized (Boswell and Straubhaar, 2004) migrant workers in the labor market; evaluation of the economic efficiency of attracting and using labor of migrant workers (Ekberg, 2004); analysis of the 'ethnic' specialization and segmentation of the labor market of the host territory (Piore, 1980; Sassen, 1988).

The latter is closely associated to the research on the dependence of individual industries and the entire economy on migrant labor (Martin, 2010; Castles and Kosack, 1973). Simultaneously, as the experimental studies disproved the assumptions of theoretical research (e.g., the effect of migration on wage changes was found to be insignificant), the view of scientists was addressed to the topic of "absorption" of migrants by the host labor market (Braun and Weber, 2016).

Russian school of economics largely moved in parallel with the research of global research. However, their distinctive feature is a broader, more ambitious approach to the subject under study. In the Soviet period, research was developed on the organization of labor migration in the context of the planned economy of the USSR (Topilin 1975), the definition of the economic function of migration in the labor market (Khomra, 1979), the impact of migration on the formation and functioning of the Russian model of the labor market (Topilin and Parfenceva, 2006). Contemporary research of Russian scientists in this field focuses on the identification of discrimination of foreign workers in the labor market and an analysis of their economic activity (Vakulenko and Leukhin, 2016; Lokshin and Chernina, 2013), the study of the forms, extent and consequences of illegal employment among migrants (Ryazantsev, 2016b; Ioncev and Ivakhnyuk, 2012), the analysis of the formation of demand for foreign labor (Vakulenko and Leukhin, 2015).

A separate niche is occupied by studies on the sectoral employment of migrants, their enclavement and the formation of migrant employment in the national economy and individual regions (Ryazantsev, 2016a; Chudinovskih, Denisenko and Mkrtychyan, 2013). Another closely related category of studies is research on the dependence of the labor market, in particular industry-wise, on foreign labor (Tyuryukanova, 2007; Ivakhnyuk, 2012). An independent area of study is the assessment of the economic efficiency of attracting and engaging foreign labor by comparing the tax deductions and the benefits received (Vorobieva, 2005), evaluating the labor

potential of migrants and the level of threats to migration (Vasil'eva, 2015), or the effective employment of migrant workers (Solovieva, 2016).

The first publications involving the sociological and ethnocultural approaches of the western scientific school were devoted to the biographical description of the life of labor migrants in the US and other countries. They appeared in the first quarter of the 20th century, in many respects, thanks to the representatives of the Chicago sociological school. It is their methodology used, the results obtained and the findings made that formed the basis for modern research in describing and analyzing the portrait and life of a migrant worker (Thomas and Znaniecki, 1918; Apitzch and Siouti, 2007). Later, the western sociological scientific school began to consider the problems of the impact of labor migration on the labor market of the host country, relying predominantly on the theory of heterogeneity of the labor market and the position of the ethnic economy proposed by the economic science school, studying the economic behavior of a labor migrant in the labor market, the phenomena of ethnic employment and ethnic entrepreneurship (Bonacich, 1973; Waldinger, Aldrich and Ward, 2000; Light, 1984; Granovetter, 1995). In turn, the emergence and development of western economic sociology that considers the components of the labor market in conjunction with social ties and relations (e.g. within the family and ethnic community) proposed a number of new, now extremely topical, directions in the study of the socio-economic position of foreign workers in the labor market – socio-cultural and economic adaptation, the state of marginalization, etc. (Castells, 1975; Levanon, 2011). In recent years, as a result of the increasing intensity of migration flows in the world, especially in the light of the last migration crisis of 2014-2015 in Europe, and the widespread dissemination of social initiatives in the field of socio-cultural and economic adaptation and integration of migrants, research in the field of social innovations, including those relevant to the labor market and employment of migrant workers, became highly relevant (Buiskool and Frouws, 2010; Benton et al., 2014).

Russian followers of the sociological approach supplement the experience accumulated by foreign sociologists in studying the portrait of a labor migrant, his demographic and socio-professional profile, life path, socioeconomic status and employment conditions in the labor market (Lokshin and Chernina, 2013; Peshkova, 2016; Sosnina, 2012; Mukomel, 2012; Chudinovskih, Denisenko and Mkrtchyan, 2013; Abashin and Chikadze, 2008). In the process of formation of Russian economic sociology in the second half of XX century, the development of research in the field of ethnic employment (Dyatlov and Grigorichev, 2015) and the socio-cultural and economic adaptation and exclusion of migrants (Mukomel, 2011; Ledeneva, 2014) have also been widely developed. A rising popularity is gained by the 'new institutional approach' to the study of interaction patterns of labor migrants with the receiving environment, in particular, their involvement in migrant networks of unskilled and skilled migrants (Lisitsyn and Rezaev, 2015).

The study of labor migration from the geography viewpoint is closely related to research within the framework of economic and sociological approaches. Thus, the analysis of spatial disproportions and peculiarities of the development of labor markets of receiving territories under the influence of external labor migration is most common in the context of studying the sectoral specialization of migrant employment and segmentation of labor markets within the framework of the economic approach of 'labor geography' (Gross and Schmitt, 2012; Schovánková, 2013). On the contrary, the study of the processes and forms of resettlement of immigrants and temporary migrant workers is interdependent with research on the formation of ethnic communities, the adaptation and integration of foreign citizens into the host society, which originated mainly within the Chicago School of Sociology (in particular, the model of spatial assimilation of immigrants) and the Los Angeles Sociological School of Urban Studies (Kain, 1968; Sinning and Vorell, 2009; Vendina, 2004). Particularly interesting are rare studies in the framework of the new economic-geographic approach of 'labor geography'¹, according to which the active activity of migrant workers is examined by changing the conditions, the environment, and the space of their employment (Herod, 1997; Rogaly, 2009).

Relatively young and least studied, but having a huge potential, is the research on the existing institutional features of attracting and using (i.e. 'absorbing') of migrant workers by the labor market depending on the

territory of migration of migrants (Krasova, 2012; Denisova et al., 2014). This direction is rooted in institutional geography.

Studies on the impact of external labor migration on the development of labor markets from the point of view of the political approach are considered in the new direction of ‘political migration’². Labor migration in this context acts, on the one hand, as an object of political control and governance, on the other hand as an object of manipulation (Efimov, 2007). The first direction involves research on the impact of foreign policy on labor migration and the development and implementation of the state migration policy with regard to the attraction and use of foreign labor, the situation of migrant workers in local labor markets, including aspects of national and regional security (Bohning, 1984; Kamenskij, 1999). The last aspect since the 1990s (after the end of the Cold War) is revealed from the position of the concept of ‘securitization of migration’³, which proposes to consider migration (illegal, uncontrolled) as a ‘new’ (‘old’ was military) threats to national security (Buzan et al., 1998; Guild, 2009). Later this trend became popular among Russian scientists (Vitkovskaya and Panarin, 2000; Efimov, 2007; Ioncev, 2003). However, the issues of the interrelationship between the processes of labor migration and security in the scientific environment have been touched upon much earlier. For example, in Austria, scientists emphasize that, since the 1960s the massive involvement of foreign workers caused the first cultural conflicts in society, and the economic crisis of the 1970s has only strengthened them (Jakubowicz, 2011). In the second direction, the focus is not only the speculation (manipulation) of the consequences of labor migration for the host country, including the labor market, on the part of political forces that use this in the struggle for the electorate, but also the general role of external labor migration in political processes in the host society (Golder, 2003; Freeman, 2015; Molodikova and Lyalina, 2017).

Studies on the effects of labor migration from the legal approach often rely on political science and reveal the role of a parliamentary component in the formation and implementation of an effective migration policy. The research generally includes the issues of improving the legislative base, legal support for state mechanisms for regulating migration processes, the responsibility of ministries, departments, officials, citizens for observing norms and rules established in the migration sphere, mobilizing the public for maintenance and implementation of migration policy (Kudryavtseva, 2009). Today, there can be distinguished three main research areas of the legal studies of the impact of external labor migration on the labor market of the host country. First, the legal framework for regulating the recruitment and use of migrant workers, the existing mechanisms and practices for implementing such policies, the legal framework for the interaction of donor countries and recipients of migrants, stakeholders are considered (Trachtman, 2009; Panizzon et al., 2015). Second, studies on the rights of migrant workers are devoted to the discrimination features of foreign workers of different categories (e.g. domestic workers, undocumented migrants, women, disabled persons, etc.) in the labor market and mechanisms for preventing violations of their rights and freedoms (Bohning, 1988; Ioncev, 2005). Third, preventing and combating the phenomena of informal and illegal employment, exploitation, as well as human trafficking among migrant workers. Illegal, undocumented migration has been recognized as one of the main migration problems since ancient times, to combat which the migration legislation is directed. The publications of OECD (OECD, 2000) and Gulina (Gulina, 2013) place accent on the challenges associated with such migration to host countries and regions (primarily illegal employment), determining the most effective legal mechanisms of counteractions.

3. Labor market security – contextual framework for diagnosing risks and threats in the sphere of external labor migration

The urgency of developing a new research direction in migration studies is due, on the one hand, to the multidimensionality of migration consequences for the labor market, including the provision of economic, social and other types of national security, on the other hand, those roles that the labor market fulfills. The proposed new research direction in migration studies is comprehensive, that is, it is designed to provide an interdisciplinary

multilateral review of external labor migration as a relatively holistic object of research without taking into account its internal structure and the interrelationships of its individual elements.

The labor market within the framework of the concept of sustainable development of the territory should be viewed as an object of regulation, through which such development is provided. For the purposes of this study, the definition of the term "sustainable development" is based on that formulated by the United Nations in the Report of the World Commission on Environment and Development: Our Common Future in 1987. "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987) (article 2 Part 1). At the same time, Russian legislation emphasizes that one of the most important conditions for state regulation of the transition to sustainable development is the creation of a well-established system of interaction "center-regions" and ensuring the sustainable development of all regions of Russia (O Konceptii, 1996).

In this context, understanding the concept of "sustainable development of the territory", which is defined in The Town-Planning Code of the Russian Federation is extremely important. "Sustainable development of the territories - providing when implementing town-planning activities of safety and favorable conditions for life activity of the person, restriction of negative impact of economic and other activity for the environment and ensuring protection and rational use of natural resources for the benefit of these and future generations" (The town-planning code, 2004) (article 1). In order to ensure sustainable development of the territory, the labor market of this territory should function in such a way that present and future generations have an alternative life support system, consisting of stable employment and diversified sources of income (Tret'iakova, 2014) (p. 28).

At the same time L. Tretyakova developed the conceptual provisions for the labor market development in the context of ensuring sustainability. She interprets the sustainable development of the labor market as "the stable development of social and labor relations, ensuring the demand for labor potential in order to achieve long-term growth in the efficiency of the regional economy, improve the quality and standard of living of the able-bodied population" (Tret'iakova, 2014) (p. 30). And the strategic goal of sustainable development of the labor market she sees "the formation of the objective economic conditions for demand of labor potential, stimulating labor demand and promote the growth of wages and incomes of able-bodied population" (Tret'iakova, 2014) (p. 31). Proceeding from these provisions, the sustainable development of the labor market should be ensured by the balance of human life in the social sphere, the economy and the sphere of innovation, geopolitics and ecology. Figure 2 shows schematically the main components of sustainable development of the labor market in conditions of attracting and using foreign labor.

Social component of sustainable development of the labor market implies satisfaction of the existing demand for legal jobs by local residents, as well as creation of conditions for the qualitative development of the labor potential of the population and professional growth. Maintaining a balance of sustainability of the social sphere will help improve the quality and standards of living of the able-bodied population.

Economic and innovative component implies meeting the demand for workers by employers and ensuring a high level of labor potential of the labor force that will enhance the efficiency of the labor market and long-term growth of the economy of the host territory.

Geopolitical component consists in ensuring the balance in using internal and external labor resources represented by the maximum number of third countries, as well as increasing the prestige of the jobs of the regional labor market on the world stage. To a large extent, this will ensure the independent development of the labor market itself and the host country.

From the environmental point of view, the labor market should ensure the preservation of human health, as a part of nature, and the environment. Substantially this can be achieved through using the labor-saving technologies

and increasing the level of safety of jobs, labor protection, and increasing the number of "green" jobs that contribute to the environmental preservation and environmental regeneration.

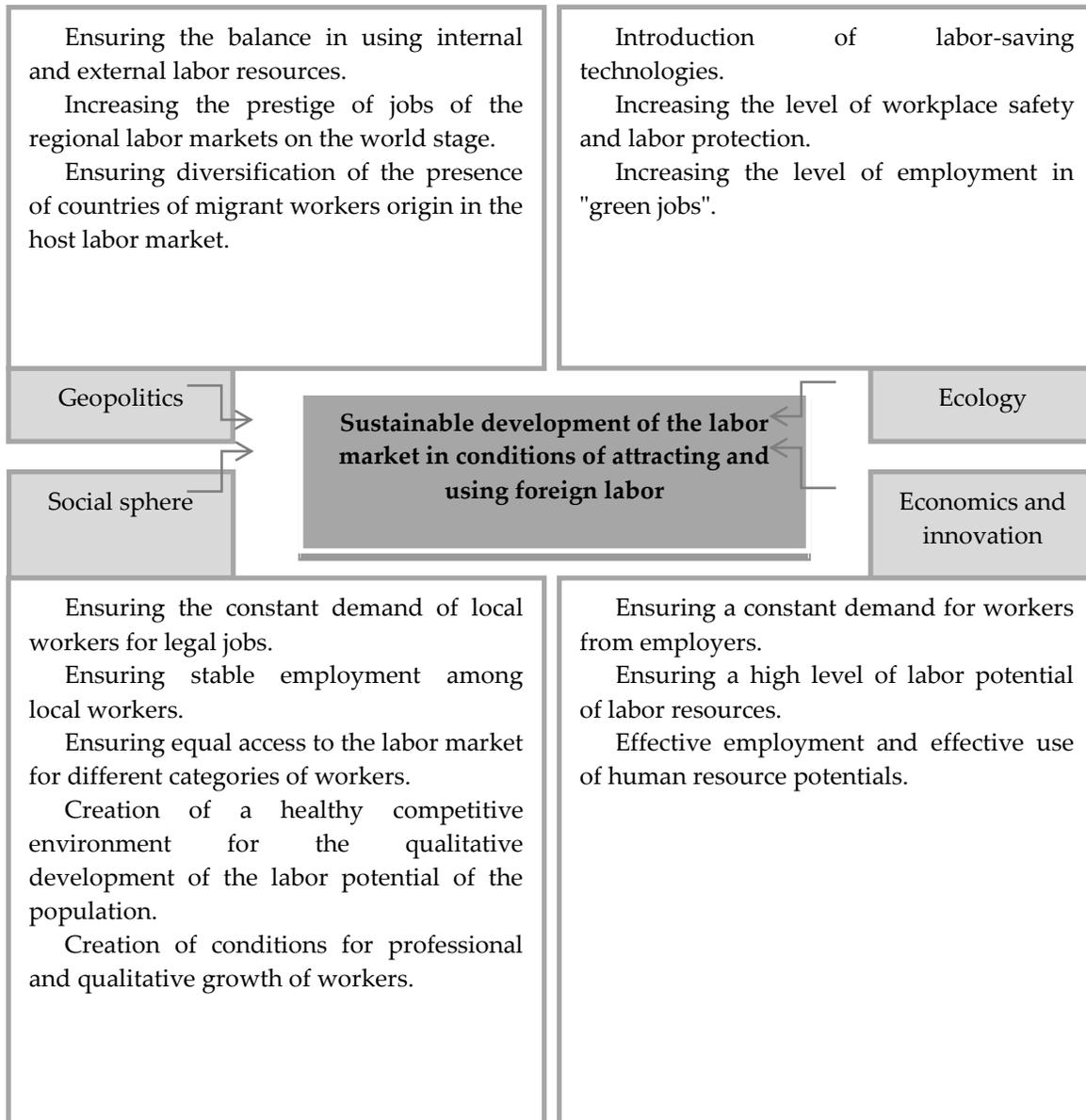


Fig. 2. Components of sustainable labor market development in the context of attracting and using foreign labor.
Source: Own elaboration.

Security is one of the criteria for the sustainable development of the labor market. The notion of "labor market safety" today does not have a well-established scientific definition. Usually this term is considered as one of the

components of the economic security of the territory. However, taking into account the fact that the labor market fulfills not only economic, but also social, innovative and geopolitical functions, it is necessary to understand what place the labor market occupies in providing, respectively, social, innovation and geopolitical security.

Figure 3 schematically shows the place of the labor market in providing economic, social, innovative and geopolitical security.

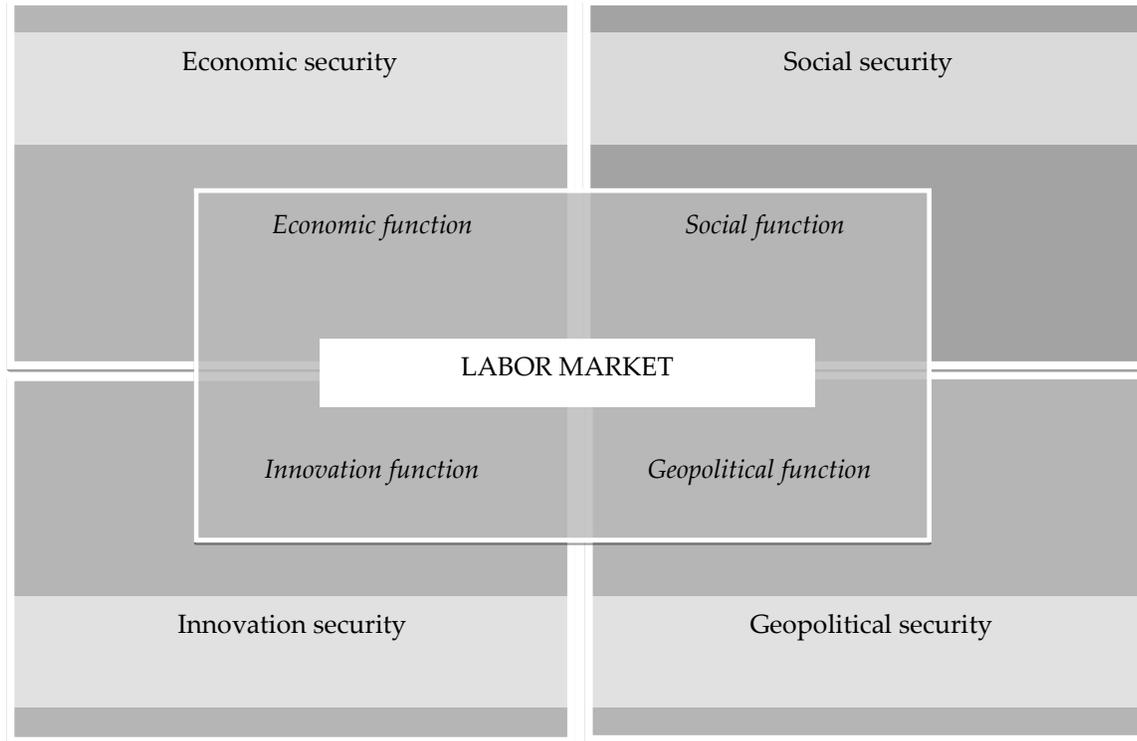


Fig. 3. Labor market in the structure of some elements of national security.

Source: Own elaboration.

Through the rational involvement, placement, regulation and use of labor, the labor market fulfills an economic function and affects economic security. From the economic security viewpoint, the labor market is its most important element, and the phenomena on the labor market can act both as a factor of ensuring its security and as a factor that enhances the threats and risks of this security (Kapranova, 2000). Employment, according to Kapranova (Kapranova, 2000. P. 145), “is an indicator that assesses ... the state of economic security of the national economy”. Its lack of able-bodied population is, according to Alonkina (Alonkina, 2008), the most significant security threat. Unemployment, especially the hidden one, attributed by Professor A. Orlov (Orlov, 1995. P. 112) to the social threats to economic security, is a ‘delayed-action mine’ laid down under the labor market in the transition period”. The labor market should function in such a way as to ensure its stability and sustainability in the event of crises and geopolitical changes and for future development, independence from external labor resources, competitiveness in world labor markets, creation of decent living conditions for every member of society.

Providing a normal level of income and welfare of the population, a stable level of reproduction of the productive abilities of workers, the labor market realizes a social function and ensures social security. As a system of socio-economic relations between the employer, the employee and the state, within the framework of the theory of social security, the labor market must ensure the life and activity of society stable and sustainable to external and internal adverse impacts and shocks, preserve its integrity, independence and the ability to reproduce and progress. After all, the problems of employment and unemployment as social threats can lead and often lead to a

worsening of the social microclimate and a decrease in the level and quality of life of individuals and society as a whole (Orlov, 1995; Bochko, 2011).

Accumulating, adapting and supporting the critical mass of labor resources of a certain level of qualification (especially high) and specialization that meets the structural needs of the territory's economy and strategic directions of its development, effectively using the labor potential of workers (including through innovative self-employment), the labor market fulfills the innovative function and contributes to the provision of 'innovation security' (Mikhaylova and Mikhaylov, 2015). The role of the labor market in ensuring innovation security is to create the factors and conditions for the formation and maintenance of the reproduction and self-development necessary for sustainable and effective innovative development of the labor economy while maintaining a sufficient level of independence from external labor resources.

The integration of the national labor market into the international labor market, on the one hand, balances the domestic demand and supply, and, on the other, forms the dependence on external labor resources and a partial loss of independence, which determines the impact on geopolitical security. The labor market from the point of view of ensuring geopolitical security should be considered in the context of the concept of geo-economics, which is its constituent element (Luttwak, 1998). The integration of the national labor market into the world labor market as a result of globalization, both through the participation of its own labor resources in the labor markets of other countries, and through the reception of migrant workers on its territory, causes close economic integration and interdependence of the states involved. Thus, the labor market acts as a regulator of this interaction and, in order to ensure geo-economic and geopolitical security, it must function in such a way as to prevent possible geo-economic conflicts caused by competition for labor resources, create conditions for the development of human capital to enhance the state's competitiveness in the international arena, to prevent the deformation of supply in the national labor market as a result of international migration (primarily, labor). Acknowledging the importance of the labor market in the formation and maintenance of the economic, social, innovative and geopolitical security of the state or a single region, it is necessary to ensure the security of the labor market itself by minimizing or eliminating external and internal risks and threats or improving their governance efficiency. Since the low level of labor market security makes it difficult to achieve other types of national security.

Theoretical interpretation of the "economic security of the labor market predetermines the realization of all vital interests of the individual, family, enterprise, society, state, even if not, at first glance, of an economic nature" (Alonkina, 2008. P. 39). The notion of 'labor market security' is generally considered as the welfare factor of the working population and reflects those aspects of economic security that are associated with the risk of job loss and its consequences for workers and their families (Hijzen and Menyhert, 2016). This approach to determining the security of the labor market does not coincide with the Russian interpretation, which focuses on analyzing external and internal risks and threats to the labor market, factors that ensure its security, which is rather comparable to understanding the role of the labor market in ensuring social and economic security, in this case, of an individual. Therefore, the term 'labor market safety' is often replaced by the concepts of 'job security' and 'career and employment security' (Pacelli et al., 2008; Green, 2011). Recently, the term 'flexicurity labor market', similar to the interpretation, has also become widely used, which means "the type of labor law policy, that is, such a direction of activity of the state (its bodies) and organizations, which manifests itself in the combination of flexibility in regulating labor and related relations and in the governance of the labor market, ensuring the protection (guarantee) of the rights of subjects of labor law" (Tomashevskij, 2011. P. 156).

The consideration of risks and threats to the functioning of the labor market takes place outside the unified labor market security theory, but separately in the aggregate of factors that affect it, both positively and negatively. The problems of demographic (e.g. population aging and the influx of migrants; Henschel et al., 2008) and social (Mondéjar-Jiménez et al., 2009) development, globalization (Siedel, 2007) and many others are being discussed.

Thus, the analysis of existing literature has revealed considerable shortcomings in the conceptualization of a single integrated concept of labor market security, taking into account possible approaches to its definition and awareness of its significance for ensuring social, economic, innovative and geopolitical security.

Labor market security can be viewed from four different aspects within the framework of existing approaches to the definition of security (Mikhaylova, 2015): firstly, as an independent system, the security of the labor market can be defined as an integral complex system of protecting the vital interests of the country and society, the rights and freedoms of the individual in the national and international labor market, ensuring its independence, efficiency, competitiveness, stability and sustainability, and the ability to develop. Secondly, as a state of protection, when a national (regional or local) market is secure from external and internal threats and risks, the citizens' needs, rights, and freedoms are met, and the state develops rapidly and efficiently while maintaining its competitive advantages over other global market participants. Thirdly, as the ability of the labor market to protect the vital values and interests of the individual, society and the state as a whole, to resist negative internal and external influences, to maintain their independence and self-sufficiency, competitiveness, integrity, balance and sustainability, ability to develop and progress. Fourthly, from the perspective of conditions and factors of the existence of the labor market, it can be defined as a set of conditions and factors of the functioning of the national (regional or local) labor market that ensure its sustainable economic, social, innovative, geopolitical development, efficiency and competitiveness, independence from external resources, ability to resist destructive external and internal influences.

The difference between regional labor market security and the national one lies in the spatial localization of the protection object (in fact, the labor market), the conditions and factors of its functioning, and the developmental risks and threats generated, the presence and depth of risks and threats, including those arising from the relationship with the federal center and other regions. Proceeding from the labor market functions identified, it is advisable to consider its security as a set of four integral components: economic, social, innovation and geopolitical, which determine the role of the labor market in ensuring economic, social, innovation and geopolitical security, respectively.

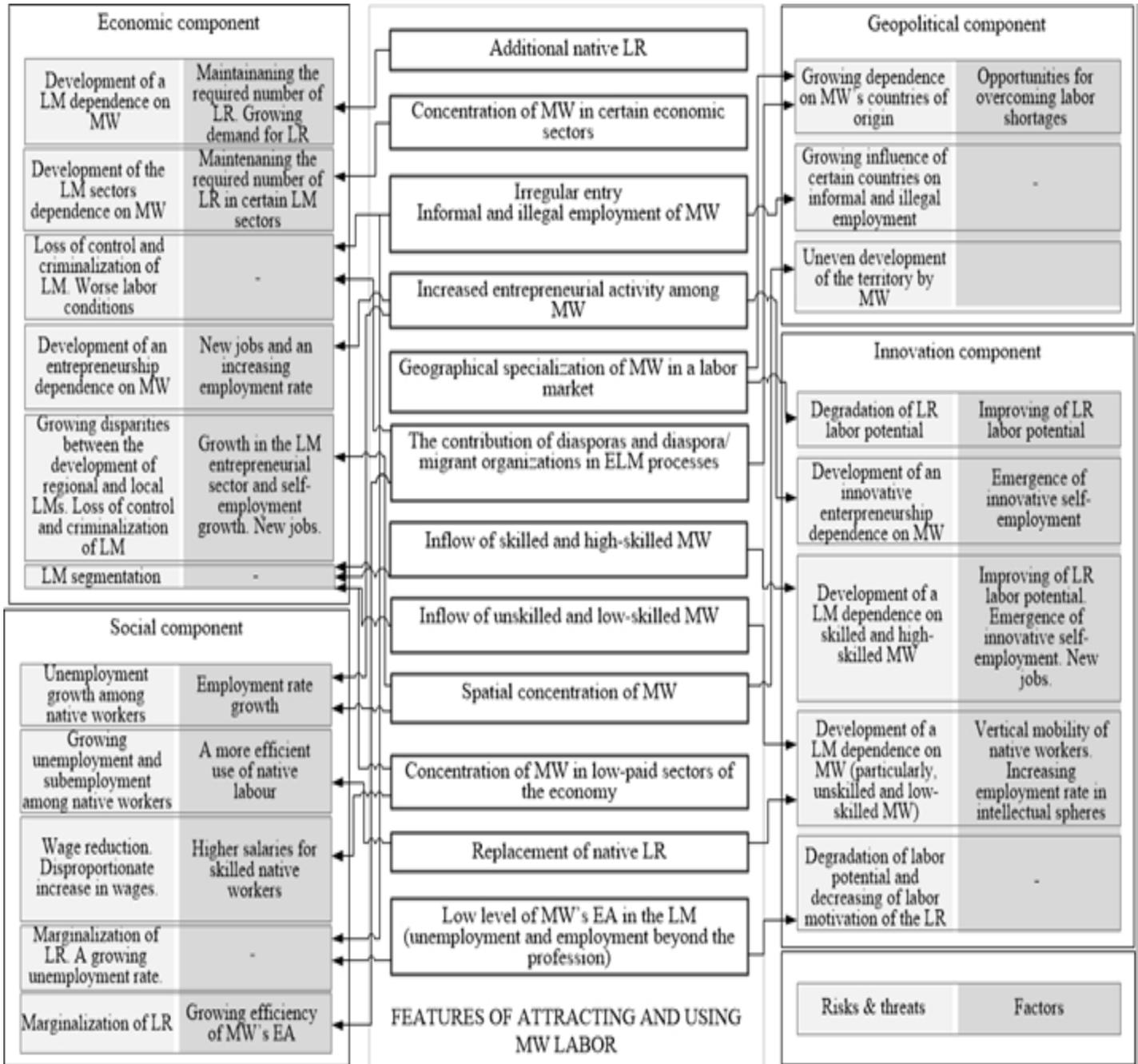
4. The role of external labor migration in ensuring labor market security as a new direction of research

External labor migration represents an impact on the development of the receiving territory from the outside, therefore the risks and threats, the factors caused are external and determine the external security of the labor market (Vitkovskaya and Panarin, 2000). However, at the same time, the multiplicative effect caused, in particular, expressed in the improvement of the education system as a result of the change in supply in the labor market, is already considered as internal.

The place of migration in ensuring the labor market security is largely determined by the role it plays in ensuring economic, social, innovation and geopolitical security – on the one hand, it plays the role of a security factor, on the other – the role of a real or potential threat. In particular, effective migration is seen as a sustainability factor of the social sphere of life, the ability to withstand the migration outflow of the population is a security factor in the social sphere of life, uncontrolled (unorganized and illegal) migration (and in some jobs, external labor migration in general) is clearly classified as a threat to sustainable development of a country, due to its negative impact on the level of crime and development of the labor market, including “the destruction of the national labor market, a drop in the level of wages, the displacement of Russians from the labor market, an increase in unemployment among the local population” (Tatarkin et al., 2008. P. 160).

Publications of Vitkovskaya and Panarin (Vitkovskaya and Panarin, 2000), Malakha (Malakha, 2005), Ioncev (Ioncev, 2003), and others, devoted to risks and threats, factors of ensuring national and regional economic, social, innovation, geopolitical security, conditioned by external labor migration, made it possible to single out the

main ones that determine the development of the labor market for migrant-receiving territory. Previously identified risks and threats, labor market security factors have been supplemented by new potential (in particular, geopolitical ones), grouped according to the nature of attracting and using migrant workers in the receiving country and correlated with labor market security components that are affected (Figure 4).



Note: EA – economic activity; LR – labor resources.

Fig. 4. Risks, threats, and factors associated with the components of the host local market security in the context of external labor migration. Source: Own elaboration

The broadest variety of risks and threats the external labor migration brings to the economic and innovation components of labor market security, stipulating not only dependence on migrant workers, but also degradation of labor potential (in the case of low and unskilled labor and / or low level of economic adaptation), further segmentation, growth of disproportions in the development of regional and local labor markets. Risks and threats to the social component of labor market security are expressed mainly in changing the socio-economic status and employment of workers from among the local population. The nature of risks and threats to the geopolitical component of labor market security is associated with the growth of the influence of individual countries on the development of the labor market. At the same time, it is important to note that the undocumented migration and the associated informal and illegal employment of migrant workers are the greatest danger in terms of the depth and variety of risks and threats. An inflow of migrant workers without or with low qualifications also plays an important role. However, the external labor migration is not only and the not only source of risks and threats, but also a factor of ensuring the security of the labor market, which is primarily due to its reproductive, redistributive and selective functions (Sitarchuk, 2012). This testifies to the possibility and necessity of regulating external labor migration, and not universal restriction or, on the contrary, easing it.

One of the most significant risks in the long term is the growing dependence of the labor market on migrant workers. A conceptual interpretation of the term ‘labor market dependence’ on foreign labor, migrant workers is based on the development of the 1970s’ theory of dependent development (Frank, 1972; Baran, 1973). According to the latter, international migration is cementing the relationship of the less developed countries to the more developed ones. Later, the theorists of globalization stated that the modern picture of the world has changed significantly, and today it is a matter of mutual dependence, mutual co-ordination of socio-economic development of countries through the formation of world trade markets and labor, international cooperation of production, etc. To determine the role of international migration in the workforce development of territories Ivakhnyuk (Ivakhnyuk, 2012) introduces and uses the concept of ‘migratory interdependence’. The author rightly emphasizes the dependence of the less developed countries on the possibility of “access to the labor markets of other states for some of their relatively surplus population” and the more developed countries from replenishment of the labor shortage by importing migrant workers or transferring labor-intensive industries to countries with a relatively low payment (ibid. 2012). Speaking about the Eurasian migration system, Ivakhnyuk notes that mutual migration dependence “is expressed in the growing interest in interstate cooperation in the field of international migration in the format of regional organizations” and is a long-term factor in the development of post-Soviet Eurasia, which causes a reduction in the risks of regional economic and demographic imbalances (ibid. 2012).

Moving away from the understanding of the dependence from the point of view of its bilaterality, which Ivakhniuk suggests, it is worthwhile to consider other views and approaches to understanding the dependence of the receiving territory on migrant workers, in order to further define the boundaries of the concept of ‘migration dependence of the labor market of the host territory from the foreign worker force’. In 2004 S. Castles attempted to give a broad definition of the term ‘structural dependence on immigrant labor’. He understands it as the state of the country’s economy when it cannot function without migrants, despite the high level of unemployment, because migrant workers are concentrated in jobs that local workers cannot or do not want to replace (Castles, 2004). Later, Martin (Martin, 2010), Abella and Martin (Abella and Martin, 2016) have introduced the term ‘path dependence’ with regard to dependence on migrant workers, which is widely used today, meaning employers’ dependence on the initially chosen path for filling vacancies by foreign workers, relying on its availability in the future. At the same time, the authors focus on the most popular and attractive vacancies for migrants – with low pay, often with unsatisfactory working conditions. Despite the fact that today the dependence on foreign labor is attributed by the Union of International Associations (UIA) to the number of world problems in the category “G: very specific problems” (Dependence on foreign labour, n.d.), so far the essence of this dependence is not revealed, featuring a dependence of individual labor-consuming industries on a low-skilled labor.

When determining the boundaries of dependence on foreign labor, firstly, it is necessary to identify to which object this dependence relates – the employer, the economy as a whole, the labor market. In the context of this

paper, the dependence of the labor market of the host territory is considered. Secondly, it is necessary to specify, the subject of research – all migration in general or its separate types. Current study focused on external labor migration. Thirdly, it is extremely important to take into account the diversity of real and potential risks and threats to the labor market caused by external labor migration. From this point of view, the following definition of the dependence of the labor market of the host country on the foreign labor force is proposed: it is a state of the labor market in which its sustainable and stable functioning is largely determined by the constancy of the volumes and the set of qualitative characteristics of external labor resources. At the same time, the dependence of the labor market on the foreign labor force includes the dependence of the labor market as a whole, its individual niches and segments on: a) foreign workers of different levels of qualifications and education, the country of origin; and b) foreign employers (entrepreneurs).

Conclusions

The systematization of the studies on the consequences of labor migration for the labor market of the host country has shown that up to date there are more than two dozen research areas predominantly in the framework of economic and sociological scientific schools. The analysis suggest that despite the fact that the issues of regulating the processes of labor migration in the context of ensuring national and regional security have been considered for almost 50 years from the perspective of the concept of ‘securitization of migration’ within the framework of the political science approach, the concept of labor market security in the sphere of external labor migration is not yet formulated. The provisions of this scientific direction are largely not integrated with the results of research on the impact of labor migration on the labor market in other research areas and schools; its potential has not been revealed.

The proposed approach to the justification of the term labor market security made it possible to unite its role in providing economic, social, innovation and geopolitical security and to single out four components of labor market security on this basis. Within these components, it seems most appropriate to consider the risks and threats arising from external labor migration in the labor markets.

Labor market security in the sphere of external labor migration can serve as an independent research topic on the effects of labor migration on host labor markets. The originality of the scientific direction consists in studying external labor migration as a relatively holistic object of research, taking into account the whole complex of possible consequences for labor market. At the same time, both positive conditions and factors of the labor market balance, as well as possible risks and threats, are taken into account. The scientific direction is one of economic and geographical, as it is intended for regional studies and allows revealing the spatial heterogeneity of the migrant receiving territories, both in determining their need for additional labor resources among migrant workers, and in the possible consequences of their use in the economies of the regions. The interdisciplinarity also determines the originality of the scientific direction. The proposed direction of research took its position at the intersection of existing 23 research directions within the framework of 5 scientific approaches, classified as a result of theoretical substantiation of a new direction. The theoretical basis of the new direction of research is the concept of sustainable development, but also uses the provisions of security theory and the concept of securitization of migration, labor geography. The concept of the balance of the labor market is understood more widely than is customary - not only from the position of market equilibrium between supply and demand, and also taking into account other balances. Within the framework of the new direction, it was suggested to study the impact of external labor migration on the labor market balance in the economic, social, innovative, ecological and geopolitical spheres. The risks and threats to labor market security, determined by external labor migration, can be statistically measured, which predetermines the practical applicability of the work in this direction. And the analysis based on the diagnosis of risks and threats will enable formulating recommendations for the modernization of migration policy in order to ensure the security of the host labor market, justifying the importance of research in this area.

List of abbreviations

EA – economic activity
ELM – external labor migration
LM – labor market
LR – labor resources
MW – migrant workers
UIA - Union of International Associations
US – United States of America
USSR - Union of Soviet Socialist Republics

Endnotes

¹ The term “labor geography” introduced by A. Herod in 1997 stands for a separate sub-branch of the school of socio-economic geography (the term does not occur in the Russian-language literature), which studies the active role of workers in the territorial organization of the economic life of society, ensuring its own survival and reproduction.

² The term “political migrationology” appeared in 2005 thanks to the work of the Russian political scientist Y. Efimov. Political migration is understood as the “branch of political knowledge, the object of which is migration processes as part of political reality, and the subject – the trends of its development and changes associated with the politicization of migration processes, with the emergence of political components in migration processes, aimed at constituting, institutionalizing, transforming political reality”.

³ The concept of “securitization of migration” was proposed by B. Buzan and O. Waever from the Copenhagen School of Security Studies (Copenhagen Peace Research Institute) in 1998.

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**FINANCING OF YOUNG KNOWLEDGE-BASED COMPANIES AFTER THE FINANCIAL CRISIS:
THE CASE OF KAZAKHSTAN**

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Abstract. Following the financial crisis of 2008, more attention is paid to access to finance for young knowledge-based firms. A study conducted before the crisis showed that it was more difficult for knowledge-based firms to gain access to finance. However, none of the studies considered the differential effect of the crisis on young knowledge-based firms. This document examines this gap using the data set of 1155 firms in Kazakhstan for various sectors of the economy. The analysis was carried out in the context of the years before the crisis of 2002-2005 and after the crisis, when the economy significantly stabilized for 2014-2017. We believe that young knowledge-based firms are more likely to be rejected for financing than other firms, and this has significantly worsened in the post-crisis period. However, regressions that control a variety of characteristic characteristics show that the deterioration in the general conditions for financing. The results show that there are two questions in the financial system. The first is a structural problem that restricts access to finance for young knowledge-based firms. Secondly, the cyclical problem was caused by the financial crisis and significantly affected the young knowledge-based firms of various sectors of the economy.

Keywords: knowledge-based economy; financial instruments; financing knowledge; Kazakhstan

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JEL Classifications: O16, O21, O31

1. Introduction

The consequences of the financial crisis of 2008 focused on access to finance for young companies. The financial crisis of 2008 firstly manifested in the banking sector (Degl'Innocenti et al., 2018). The increase in the key rate complicated the situation not only for business and consumers, but also for the banking sector, increasing the risks of non-return and lowering credit activity (Cubillas et al., 2018). A complex financial situation, right up to the

deprivation of licenses, arose among a significant number of banks inside the country, plus the freezing of accounts of the largest domestic banks abroad. In addition, the consequences of the financial crisis have led to mistrust and increased risks of investing into young knowledge-based firms.

However, experts confirm that young knowledge-based firms will stimulate economic recovery (Degryse et al., 2018). In the conditions for the formation of a knowledge-based economy and the development of absolutely new forms of production, it is necessary to develop young knowledge-based firms in Kazakhstan. Every year in Kazakhstan there is an increase in young knowledge-based firms, which is 8%. The development of young knowledge-based firms is an important area of public policy (Bartz and Winkler, 2016). However, most young knowledge-based firms have funding problems (Protogerou et al., 2017). In particular, young knowledge-based firms - those that introduce new products, processes or business models - are likely to create new markets, achieve rapid growth and help the economy recover. External finance can be especially important for young knowledge-based firms, as they lack internal resources to successfully commercialize innovation (Wang et al., 2017). However, these are young knowledge-based firms that often get harder to obtain financing (Keasey et al., 2018, Karabag, 2018, Rosenbusch et al., 2017, Mackevičius et al., 2018; Wang et al., 2018). Knowledge-based firms tend to have more risky business models that are important for creating new markets, but they are also valuable for banks. They often rely more on intangible assets than on physical property, but intangibles are difficult to assess because they are context specific and therefore difficult to use as collateral for lending. The data on this issue are not final, but some authors believe that the most important firms for the economy often find it more difficult to obtain financing (Petruzzelli, 2018). It will be noted that it is very important for Kazakhstan to attract investment for young knowledge-based firms.

However, although there is sufficient evidence of a general problem of access to finance in the economy, there is little evidence of how the credit crisis and its consequences have affected access to finance for young knowledge-based firms in particular. This led Colombelli and Quattraro (2018) to state that the specific short-term and long-term effects of the financial crisis after 2007 are an open question on which further research is needed. Studies have shown that investment in high-tech production can be reduced during this period.

2. Methodology

This survey is based on data from the National Agency for Technological Development, a government record of knowledge-based enterprises. We use two waves of data: 2002/5, 2014/17. This provides data on the characteristics of firms, including innovations and applications for financing. We use a combination of simple quantitative analysis and econometric analysis to investigate the relationship between high-tech production and access to finance, controlling both the characteristics of the firm and the likelihood of application. We also use the political implications of our research.

Our results show that young knowledge-based firms - those that introduce completely new products or processes - have a higher probability of applying for funding than other firms (higher demand), but they are more likely to impede access to finance (limited supply) . Of our two-dimensional results, innovative firms that apply for funding are more likely to find it difficult to obtain. This absolute effect of credit rationing has significantly worsened since the crisis.

This document introduces a number of publications in the literature on access to finance for young knowledge-based firms. This is the first thing that empirically examines the question of how the access to finance for young knowledge-based firms has changed after the crisis. To date, most of the financial information has been focused exclusively on venture capital and other equity instruments (Zhang and Mayes, 2018). Instead, we focus on more standard, but more common forms of finance. We are also expanding the analysis beyond the intensive high-tech

R&D industries (Bertoni et al., 2015). Moreover, our measure of innovation is more inclusive than in other studies, which tend to focus on R & D activities.

3. Access to finance for young knowledge-based firms

Nevertheless, it is not always clear that innovative firms can gain access to the financial resources they need. For some time, researchers have been concerned about potential structural problems in the financial system that make it difficult for young knowledge-based firms to access finance they need (Cozza, 2018). In addition, the credit crisis of 2008 will have a cyclical effect. Credit limits will exacerbate the availability of finance for all firms and may also exacerbate problems for certain firms, in particular such as young firms.

There are three main reasons why there may be a structural problem of access to finance for young knowledge-based firms. First, returns to innovation may be uncertain and make innovation more risky for funding (Zhang, 2015, Hud and Hussinger, 2015, Dorner et al., 2017). Only a fraction of companies experience significant growth after investing in innovative activities because many products can not be successfully marketed or simply fail in the marketplace. There can be no assurance that investment in research and development (R & D) will successfully lead to new products. The default rates are often high and make innovation a risky activity.

This problem of uncertainty can be particularly acute for young knowledge-based firms that are unable to invest in multiple projects and thus run the risk of putting all their eggs in one basket (Wang and Yang, 2012). Previous research has shown that the returns from innovation can be very different. A small number of innovative projects generate significant growth, but least of all low profits (Samagaio et al., 2018). Large companies are able to manage more diversified portfolios, and even if they have more outages, they are more likely to achieve at least a highly profitable innovation.

Second, there may be asymmetries that make it harder for banks to value innovative investments (Zhang et al., 2013). This is partly due to the uncertainty issues outlined above. But it could also be because innovative products are new by definition - they may require a special evaluation as provided by a venture capitalist. The skills needed to assess investments may differ from other types of firm's loans and investments and may be very sector specific. Because banks are less interested in the value of the company than venture capitalists or other external investors, they finance less innovation than a key criterion for banks. As the company has more information about the potential success of innovation than the financier, the innovation finance market may in some cases be similar to De Socio (2013) Lemon Market - a lack of information on which companies are worth funding increases the cost of finance and reduce the likelihood of successful applications.

Several studies have found evidence of a structural problem in providing finance to young knowledge-based firms. Research has focused more on the ability of companies to access the funding they need for innovation. Plank and Doblinger (2018) point out those financial resources are more of a factor hindering innovation young firms and high technology sectors. This is confirmed by studies using different data sets (Corredoira, 2018). Agénor and Canuto (2017) shows that small businesses applying are finding it harder to obtain loans than others, although their results are more compelling for R & D-intensive young businesses than for those who introduce "novel" products and processes paper.

3.1. Financing young knowledge-based firms in Kazakhstan

It is clear from the table that the proportion of young companies from the high-tech industries in which investors are active does not differ between the two observation periods: f start-up companies from 2007 to 2012 and start-ups from 2014 to 2017 received funding. However, the number of companies they finance in the high-tech sector

has fallen from around 231 (2002-2005) to 138 (2014-2017). Between the two observation periods, the number of start-ups has declined overall.

Within the high-tech industries, there are clear shifts in emphasis between the two periods considered. Thus, both the proportion and the absolute number of young companies with a commitment of funding in the high-end manufacturing segment (Software) increased significantly (the proportion from 0.87 to 5.80%, the number from 2 to 8) while high-tech industrial sectors (Mining engineering and Aircraft engineering) can be said to be constant in the engagement of funding.

Table 1. Number and shares of companies financed by investors, founding cohorts 2002-2005 and 2014-2017

Industry	2002-2005	2014-2017
Aircraft engineering	1 0,43%	1 0,72%
Mining engineering	2 0,87%	2 1,45%
Software	2 0,87%	8 5,80%
Medically-led laboratory	5 2,16%	8 5,80%
High-tech comp.	9 3,90%	13 9,42%
Information technology	11 4,76%	14 10,14%
Automotive industry	5 2,16%	10 7,25%
Biotechnology	11 4,76%	17 12,32%
Electronic technology	40 17,32%	19 13,77%
Construction	13 5,63%	8 5,80%
Trade	31 13,42%	14 10,14%
Not high tech comp.	101 43,72%	24 17,39%
Total	231 100	138 100

Financing also plays a not insignificant role in non-technology intensive sectors. Overall, the share of young enterprises in which funding are active is decreased from 43.72% till 17.39. It says that the proportion of funding to the knowledge-based enterprises increased only because of the government support.

3.2. Financing young knowledge-based firms in Kazakhstan

We use two measures, both in terms of morbidity and severity of limited restrictions (see Grilli and Murtinu, 2014). Specialists of funding sources, such as Venture Capital, are included, but they only apply to a small proportion of young knowledge-based firms (about 1 percent of those who apply for funding).

(1) Profiles, which had problems with financing from the first sources, tried.

(2) Firms that did not receive all the finances they needed from the first source they tried.

These measures reduce the level of regulation, not being able to access all the requested loans, and also point to the potential costs of searching, as initial applications are rejected and firms are looking for alternative sources.

3.3. Innovative firms and crisis

The results above may be due to other characteristics of the firm, while innovative firms are more likely to seek growth or other characteristics that correlate with access to finance. In order to control this, we evaluate a series of regression model tests to see if firms have difficulty in obtaining finance. They take two forms: (1) regression probit, where the dependent variable is either a funding request, or one of the access measures to financing discussed above, or an option for application. In addition, we include aset independent variables that control other characteristics of the firm, which can be associated with both applications for financing and with the success of applications.

3.4. Independent variables

We also include control variables for a set of these brand characteristics: company size, age and sector and current changes in firm turnover. First, we control this with three age categories - whether they are firms aged 5-10 years or 11 years. The reference category is five years. In a recession, older firms became easier to obtain credit, although sometimes this was explained by their large size (Xiang et al., 2018).

Statistical data for the sample are shown in Table 2. Firms are usually relatively old, 39% older than 10 years, 40% - between the ages of 5 and 9, and a minority - less than 5 (19%).

Table 2. Variable list and summary statistics

Variable name	Description	Mean	Std. Dev.	Min	Max
Innovator	1 if firm has introduced an entirely new product of process in previous 12 months; 0 if not.	0.119	0.435	0	1
Post-recession	Firm is sampled in 2010 or 2012 (0 if 2007/8)	0.214	0.594	0	1
Age > 10	Firms is aged more than 10 years	0.394	0.527	0	1
Age 5–10	Firm is aged 5–9 years	0.401	0.498	0	1
Age < 5	Firm is younger than 5 years	0.194	0.402	0	1

A total of 1155 observations. Summary statistics are unweighted.

4. Results

Table 3 presents our main outcomes which are probit regressions where the dependent variable is whether firms submitted funding requests (columns 1 and 2), and independent variables are the set of controls described above. Models 1 and 2 take into account the probability of that firms` application for funding. The comparison with firms in the reference category reveals that firms based on knowledge are more inclined to apply for financing than other firms. Although the post- recession ratio has a positive meaning, it is not considerable at standard degrees. In column 2, the sample is divided into two groups of innovative firms: ones before and ones after the recession. Although the meaning of ratio for both variables is positive, in both cases it is not essential. But any effect has a larger power for innovators in post-recession period.

Table 3. Probit regression results: Problems accessing finance

	(1)	(2)
Innovator	0.127** 0.0064	
2002/5	0.0317 (0.0548)	
Non-innovator (2014/17)		-0.00182 (0.0611)
Innovator (2002/5)		0.114 (0.0740)
Innovator (2014/7)		0.131 (0.112)
Age 10+	-1.094*** (0.108)	-0.653*** (0.141)
Age 5–9	-0.194*** (0.0507)	0.0187 (0.0780)
Obs	1155	1155
Pseudo R2	0.0397	0.0397

According to achieved results, knowledge-based companies have more difficulties in receiving finance in consideration with other firms, even controlling for relevant factors such as scale and sphere. The ratio on the ‘knowledge-based’ variable is considerable in opposition to each of the first three variables for trouble in accessing funding.

We likewise reveal that they tend to encounter absolute credit rationing from all sources, though the coefficient is only essential at the 10 per cent significance level. Our outcomes obtained show that the incapability of financing knowledge-based firms turns into a structural problem of financial system. Additionally, our evidence demonstrates that firms in 2002/5 are more likely to get a refusal of credit than those in 2014/7. In every model the ratio for the ‘2014/7’ dummy is considerable. Loan conditions have deteriorated in the period for all firms, despite whether they are knowledge-based or not, representing the periodic effect of the crisis. The conspicuous exception to this common model is for absolute rationing from all sources. Before the financial crisis, knowledge-based firms were not especially likely to be incapable of finding finance from any source—since the crisis, they are much more likely to encounter absolute credit rationing. The control variables give further understanding of types of firms who have problem accessing finance. Each of these outcomes is unsuspected, and so suggests that choice maybe an issue and that these firms may be more likely to apply for finance. At the end, we find proof of the fact that age matters and that there is more difficult for younger firms to access finance.

5. Conclusions

Because of the large financial crisis, access to financing is getting to be thought an increasingly considerable barrier to business growth. It particularly turns into a problem in case it hinders innovative feeds from obtaining access to the funding they need to yield knowledge-based products and processes to the market, grow and create jobs in a definite region.

In this document, a large-scale survey of Kazakhstan knowledge-based firms before and after the crisis to explore the differential risk of a "credit crunch" on innovative firms (Mutanov etc., 2015).

The outcomes reflect the fact that young knowledge-based firms have more difficulties in getting access to financial resources in comparison with other firms. However, the worsening of loans accessibility conditions and,

especially the amounts accessible for the past two years is systemic for all firms, and not for knowledge-based firms.

Moreover, in some respects the recession decreased the gap between the two groups of firms, possibly signifying surplus credit foremost before the crisis. But, these common conclusions are not verified when we distinctly regard the absolute credit rating from any source (ie, firms that are not able to obtain any finances at all). Knowledge-based firms started in a complete disadvantage in comparison with others.

Even so, whereas financing conditions have worsened in a crisis for both types of firms, the state of knowledge-based firms got worse for this reason and as a result knowledge-based firms are likely to encounter absolute credit rationing. Our outcomes have some effects for the theory in this area.

Indeed, some of the results may be connected to the transformed composition of firms, as some firms are closed in the crisis period. They are likewise consecutive with the theory of demand for goods with worsened balance sheets, which decreases the potential for firms for making investments using internal capital and, thus, provides their funding from the outside.

These theories also accord with our conclusion that, in spite of the deterioration in financing quality, the relative gap between innovative and non-innovative firms is covered. Taking into account the confined availability, banks may have looked for closer acknowledgment, which could enlarge investment in growth. It is difficult for them to reconcile with our conclusion that the absolute decline in rationing has worsened for innovative firms in both absolute and relative terms. The interpretation can be more usual, banks are ready to give a definite sum of incremental working capital to maintain firms, but are not able to provide large amounts of investment to bring new innovations to the market. According to our outcomes problems remain for young knowledge-based firms, and that it is not only due to the risk profiles. Actually, using standard credit scores, there are very few considerable distinctions in risk profiles between knowledge-based firms and other firms. This denotes that they give a new level to long-standing problems about the essence of bank funding for young knowledge-based firms in Kazakhstan (Sagiyeva et al., 2015).

Especially, there is a probability of discouragement when innovative firms lose willingness to look for financing. (Sagiyeva and Zhuparova, 2013). Our outcomes indicate that innovative firms, if at all possible, are more tended to apply for financing than before the recession. But, we are not able to say whether this is in virtue of the growth in demand for working capital, rather than long-term financing.

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**BETWEEN SUSTAINABILITY, SOCIAL COHESION AND SECURITY
REGIONAL DEVELOPMENT IN NORTHEASTERN ESTONIA***

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Abstract. In 2012, the European Parliament (EP) established Sulphur Emission Control Areas (SECA) in Northern Europe comprising the North Sea, the Baltic Sea and the English Channel where from 2015 ships are obliged to use bunker fuel with a sulphur content not exceeding 0.1%. Estonia is a maritime fuel producer due to its oil shale reserves in the North-Eastern parts of the country (Ida-Virumaa County). A large part of oil shale is used for the production of maritime bunker oil. Unfortunately, the sulphur content of oil shale is higher than it is allowed by the SECA regulations. The Estonian oil shale industry represents up to 5% of the national economy and plays an important role in a weakly developed Ida-Virumaa County, which shares a common border with Russia and hosts the majority of Russian-speaking Estonians. Approximately half of this regional workforce is employed directly or indirectly in this industry giving the oil shale industry an important role in the county's economic well-being. In addition, periods of low oil prices are putting extra pressure on the oil sector, which endangers the traditional business model of the Estonian oil shale industry.

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The research investigates the impact of the environmental regulations in the shipping sector on the socio-economic situation in North-Eastern Estonia and discusses political consequences for the region. The paper highlights possible regional development strategies for Ida-Virumaa County and their impact on sustainability, social cohesion and security issues in the context of the integration of Russian speaking Estonians into the Estonian society. Methodically, the research is based on expert interviews, a survey, a case study, and a further exploration of potential political options to improve the social coherence in North-Eastern Estonia.

Keywords: *social cohesion; security; regional development; sustainability; smart specialisation*

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Additional disciplines ecology and environment; environmental engineering; energetics and thermoenergetics.

1. Introduction

Around 90% of the world's cargo is transported by ships and are related to a high magnitude of harmful emissions comprising CO₂, SO_x, ODS, VOC and NO_x (Unctad, 2015; Jiang, L., Kronbak, J., & Christensen, L.P., 2014). Consequently, the International Maritime Organization (IMO) launched several clean shipping initiatives in order to harmonise emissions legislations among nations to force the shipping industry to operate with the cognisance of the environment. Sulphur emissions (SO_x) especially was tackled by the "Regulations for the Prevention of Air Pollution from Ships" in the sixth annexe of the MARPOL (International Convention for the Prevention of Pollution from Ships) Convention of the IMO through the creation of the Emission Control Areas (ECA) with limits for different kinds of emissions in these areas.

In 2012, the European Parliament (EP) established Sulphur Emission Control Area (SECA) in Northern Europe including the Baltic Sea where ships must use low sulphur fuel content from 2015 and the limit must not exceed 0.1% (1,000ppm) (Directive 1999/32/EC amended in Directive 2012/33/EU; IMO, 2014). Despite the fact that only about 0.3% of the world's water surface represents SECA currently, the implementation of the regulations has spurred discussions on if or/and how they affect maritime stakeholders as well as the economy in the Baltic Sea Region (BSR). These discussions gained global interest because the Marine Environment Protection Committee (MEPC) of the IMO decided in October 2016 to reduce SO_x content in bunker fuel worldwide to include both SECA and non-SECA to 0.5 % (5,000 ppm) from 2020 (IMO, 2016).

For Estonia, the introduction of SECA regulations represents an issue of national interest since Estonian oil shale industry is an important producer of oil shale, a maritime bunker fuel that contributes up to 5% of the national GDP and about €300 million to the state budget (including employment taxes, environmental taxes). The Estonian oil shale industry is concentrated in Ida-Virumaa County and plays an important regional role for a county, which is situated in the North-Eastern part of the country at the Russian border. Ida-Virumaa County represents an economic weakly developed region with about 150,000 inhabitants equipped with the highest unemployment rate in Estonia (13.2%, Estonia: 6.2%), a high labour pressure, a low average regional income (ca. 81% of Estonian average) and the highest concentration of the national majority of Russian-speaking Estonians (ca. 77%) (SYBE, 2016). Approximately half of the regional workforce is employed directly or indirectly in this industry so that changes in oil shale business will have direct socio-economic consequences (Olaniyi & Viirmäe, 2016). Since the fall of the oil prices in the second half of 2014, the Estonian oil shale has been under economic pressure, which was further amplified with the implementation of the SECA regulations since 2015. The Estonian maritime bunker fuel challenge increased because of oil shale high sulphur content of about 0.8%, which is higher than the SECA regulation limit of 0.1% w/w in the BSR as well as the 0.5% w/w global 2020 limit.

After the Ukrainian crisis in 2014, the integration of the about 25% Russian speaking Estonians became a top issue on the political agenda in the Baltic States and within the NATO. Kivirähk (2014) pointed out that about half of the Russian minority is relatively and completely unintegrated into Estonian society but a higher quality of living in a prosperous, high-tech Estonia than their compatriots in Russia will assuredly bring a foreseeable future loyalty for Estonia their host country (Hockenos, 2015). This scenario might change, especially in Ida-Virumaa County, if the economic frame conditions are reduced especially when the oil shale industry link with the social cohesion in Estonia is considered (Prause & Olaniyi, 2017). Consequently, special reconciliation and counter-strategies to combat Russian propaganda in Central and Eastern Europe were initiated including also parts of NATO area with a focus on Russian speaking minorities in order to strengthen social cohesion and integration as instruments to safeguard the security and to prevent Ukrainian conditions (Pomerantsev & Lucas, 2016).

The paper addresses the following research questions: What are the political options for regional development for the Estonian oil shale industry and North-Eastern Estonia? How the economic and social cohesion in North-Eastern Estonia be kept in the context of sustainability and security. The authors participate in a European project on the assessment of the impact of SECA regulations on the Baltic Sea Region (BSR) so that the research is based on expert interviews, a case study from Estonian oil shale industry and a survey among regional development experts. The paper is organised as follows: after the introduction, there is the theoretical background of SECA and environmental regulations, Estonian oil shale industry, regional development, sustainability, national and political Security. The next section describes the system of methods used for this research followed by the result part, which comprises a case study from oil shale business and political options for North-Eastern Estonia. The findings and their implications are discussed and summed up in the last section which is followed by a conclusion.

2. Theoretical Background

2.1. SECA Regulations

The impact of sustainable transportation and green supply chain management have been intensively discussed among scholars so that before the introduction of SECA regulations in BSR in 2015 the tentative changes for maritime stakeholders in BSR have been an important issue (Rao & Holt, 2005; Hunke & Prause 2014; McKinnon et al. 2015). Notteboom (2010) estimated economic disadvantages from SECA areas to maritime stakeholders who have to comply with the strict environmental regulations competitors in other parts of the world are not subject to. The Institute of Shipping Economics and Logistics from Bremen (ISL, 2010) forecasted a disproportionally increase of maritime transport costs in SECA regions initiating a cargo shift from sea to land transport so that shipping companies and ports would lose handling volumes and income. Other discussions (i.e. Wiśnicki, et al., 2014; OECD/ITF, 2016) argued that the regulations would weaken the competitiveness of European maritime transport especially in the modal shift of cargo flows from marine transport to inland transport routes of which, the implementation costs to the maritime sector would be between €2.6 billion and €11 billion by 2020 (AirClim, 2011). However, after 2015, no such significant changes are witnessed and the vessels that operate in the Baltic Sea now use fuel that is low in sulphur content (Olaniyi et al., 2018).

There are also ongoing debates on the impact of governmental policies and regulations on national growth. Using the endogenous growth theory, Barro (1991) pointed out that regulations generally introduce distortions such as high tax rates, spending and heavy investments that do not provide compensating incentives but give room for the price and markets alterations that are investments deflators and negative to markets growth. Since productivity growth plays an important role in any economy, any distortions that adversely affect entrepreneurial activities have great significances for the growth of any economy (Solow, 1994). In the same light, Jaffe et al., (1995) argued that regulatory decisions are too time-consuming and are often characterised by litigation and other legal power struggles that last for decades of reforms with additional policies to the existing ones leading to what they

called "transition costs". Regulatory interventions impact investment choices which ultimately have a great effect on the economy because the build-up of regulations over time often lead to duplicative, conflicting, and even contradictory rules, and the multiplicity of regulatory constraints complicates and distorts the decision-making processes of companies or stakeholders operating in such economy (Martin & Sunley, 1998). Affected companies usually respond to individual regulations and the accumulation by changing their strategies for innovation process and these activities are embedded in research and development (R&D), expansion, equipment upgrade and processes (Bourlès et al., 2013).

Rebelo (1991) claimed that regulations are the major cause of a decrease in productivity. New institutional economics theory postulates that the economic development of a country is governed by its institutions (also called "active rules" like laws, customs, and regulations) (Coase, 1998). This involves *transaction costs* or *enforcement of contract* which are expensive, reduce productivity and impose large direct and indirect costs on the stakeholders or more so at the society (Bourlès et al., 2013). This makes it imperative to balance the costs-benefits of any regulations by identifying and implementing pragmatic cost-effective regulatory instruments, whether conventional or market-based interventions because, the constant and avoidable expenses and investment could lead to societal waste (Blind, 2012).

However, Olaniyi and Prause (2016) explained that the innovation that stems from these activities is a key driving factor for economic growth and social wealth since innovative products and services emerge more often as a result of a cross-sectorial combination of technologies, design and business models. Solow (1994) clarified that irrespective of the distortion any regulation might bring, every economy depends on investments in knowledge creation like research and development and in the manner in which they lead to innovation to create productivity. Furthermore, economic competitiveness depends on strong links between research, innovations and actors in an industry (Prause et al., 2011; Olaniyi and Reidolf, 2015). This means that, theoretically, companies imposed by regulations are forced to invest more in the production process. While "production" of new technology, may require high financial input, they sometimes yield high returns. The impact of government intervention on economic growth does not only involve the direct and indirect costs associated with each regulation, but they can also at the same time create stability connected to wider macroeconomic benefits such as GDP increases, competitiveness and productivity effect. They also produce other intangible benefits like protection of fundamental rights, social cohesion, international and national stability the economic status of any nation (Renda et al., 2013).

Maritime fuel producers in recent times have been plagued with downward price fluctuations alongside the usual sector challenge of speculations and economic forecasts, conflicts in different parts of the world, production estimates from the oil-producing countries, stock levels, seasonality, weather and accidents (Nugraha, 2009). The positive side of oil shale industry is that recently the industrial sector gained increasing interest since after a long time of decline re-industrialisation and enjoys a renaissance on the Western economic agenda because politicians, business leaders and scientists are recalling the role of the industrial sector as a key driver of research, productivity, and job creation. This particular industry generates about 80% of the EU's private innovations and 75% of its exports (Prause, 2015, 2016).

2.2. North-Eastern Estonia and its Oil shale Industry

Estonian oil shale industry represents one of the most important national industries, which gives Ida-Virumaa County the highest industrial share in the regional GDP and an analysis of the statistical figures underpin the connection with innovation and exports. Kallemets and Tänav (2017) pointed out that for the Estonian innovation sector between 2012 and 2013, the Estonian oil shale sector was responsible for more than 15-20% of total Estonian R&D expenditure. Furthermore, the authors, using figures from Estonian Patent Office calculated that Estonian oil shale research yielded approximately 9% of all patents and 6% of all useful models granted by the

patent office within this time. Furthermore, Kallemets and Tänav (2017) also highlighted the link between €25.9 million expenditure on R&D of Estonian oil shale companies between 2009 and 2015 to be related to €434.6 million worth of innovation led investments into the physical capital in the whole value chain of oil shale mining and processing. Thus, during that period, a multiplier factor of 13.2 between R&D and investments was observed. Finally, the authors stressed the high potential for the Estonian oil shale business for further value-added gains through R&D due to the opportunities the low sulphur maritime fuel production or in the blends with other crude oils in regular refineries spurred by the SECA regulations. In this case, R&D and innovation can help the upgrading of oil shale to higher value oil products with an increased value of the product by 30-40% necessitating investments of several million euros into upgrading units.

Interestingly, these aspects are not represented in the Estonian smart specialisation strategy. The smart specialisation approach is a decentralised coordination approach to public interventions for the support of innovation and structural change in Europe (Foray & Goenega, 2013). By investigating the regional development aspects, the smart specialisation strategy of Estonia has to be considered since the European Union stressed the principles of embeddedness and connectedness as criteria for fund allocation (McCann & Ortega-Argiles, 2013; Prause, 2014; Olaniyi & Prause, 2016). Regional innovation strategies for smart specialisation build on a region's capabilities, competencies, competitive advantages and the potential for excellence in a global perspective. One of the key concepts of the smart specialisation approach is the self-discovery or entrepreneurial discovery process so that smart specialisation is flanked by supporting entrepreneurial self-discovery as well as by fostering innovation activities in the different regions (McCann & Ortega-Argiles, 2013). To this end, the bottom-up development is paramount to the major objectives of regional policies, which are to tackle unemployment, increase economic growth and to decrease inequalities in a country and among countries (Olaniyi and Reidolf, 2015)

The Estonian smart specialisation strategy concentrates on three thematic fields using the ICT as an enabling instrument implemented horizontally in all sectors, health, and more efficient value-added use of resources (EAF, 2013). Three ICT sub-sectors, where the potential is highest, are the use of ICT in the industry (robotics), cyber security and software development. Health as a research field has been developed in the Estonian academic research environment over the last decade. The country offers several high-ranking research centres in this field and has relatively significant participation in international projects. Health as one of the key innovation fields is supported by various activities on the national and international levels. In this growth area, special attention is given to biotechnology (personal medicine) and e-medicine. The term resource efficiency, as used in the smart specialisation strategy, is used in a very broad way as it includes material science, housing, food and the chemical industry. In all those areas, the public research environment is an active partner in national and international research projects. Under the theme of the efficient use of resources, special attention is given to using resources efficiently and creating additional value-added.

2.3. Sustainability

Sustainable development (SD) is rooted in community values and future hopes and is the core for regional strategies creation (Coelho et al., 2012). A common paradigm subjected to diverse analyses and definitions and often used interchangeably with sustainability. The most cited definition of sustainable development was made in *our common future* report and defined as the process that ensures that the needs of the present are met without compromising future generation's ability to meet their needs" (WCED, 1987). Nessa et al. (2007) tried to differentiate sustainability and sustainable development by equating sustainability to the quality of life that must not jeopardise the future whereas sustainable development centralises on humans' right to a healthy and productive living for now and the future, making both definitions in principle the same.

There are three pillars of SD namely: the economy, social and environmental sustainability (Moldan et al., 2012). Bringing to focus on how “harmony with nature” is imperative for human survival while equal enablement is made for today’s resources as well as for future generation (Nessa et. al, 2007).

Preserving the economy has played a paramount role in diverse development discourse (Moldan, 2012). Linking productivity to labour and capital, Vallance et al. (2011) explained that high productivity is an indicator of profitable income. This particular science in sustainability focuses on job creation, education and health plus the prosperity of the dwellers of a particular environment (Goerner et al., 2009). From Maslow hierarchy of need, human basic needs i.e. physiological need, need for survival, safety, love, and self-esteem must first be satisfied before other needs are considered (Maslow, 1968, 1999). This stance connects human beings needs with the environment through economic development. In other words, the satisfaction of basic needs precedes environmental worries (Vallance, et al., 2011). They illustrated this by accentuating the limitation of sustainability policies due to social acceptance and that poverty is an obstruction to the adaptation of any sustainability issues.

The social pillar of SD broadens the extent to which social values, identities and relations can influence the future. Humans cannot survive without a safe environment nor in a non-resilient economy (Black, 2004). Also called societal cohesion, it forces society to labour for a common purpose. This is critical for the interconnectedness of generations (Moldan et. al., 2012) demanding for a harmony between the three mainstays of SD (Goerner et. al., 2009).

Increasing worry about environmental sustainability is taking the lead in most debates on security and policy obligations (Migone, 2007). Life is heavily dependent on the environment making it imperative for humans to live within its limitations (Moldan et al., 2012). The environmental pillar pursues the improvement of social welfare through the preservation of nature used for raw materials and ensuring that generated waste from these activities does not threaten the same lives it is preserving (Goerner, et. al., 2009).

Inferences from SD places a lot of emphasis on careful reflections that bring timely policy interventions that attain economic and social improvement that would not compromise the environment. These pillars are interrelated, interconnected and dynamic (Nessa et. al, 2007). This is why for SD to work in any given society, Nessa, et al. (2007), suggested the practice of adaptive governance that emphasizes that policy interventions, their frameworks and instruments regularly adopt new and evolving situations. It would involve flexibility and constant monitoring that must be accurate, measurable and futuristic to identify change as at when needed (Pupphachai & Zuidema, 2017; Coelho, et. al., 2012; Mascarenhas, Nunes & Ramos, 2015).

SD main goal can thus be summarised as preserving nature but at the same time preserving life for the future (Migone, 2007). This provides the prospect to incorporate security and safety in SD. As a political issue, security issues have to be tackled side-by-side live preservation (Allouche, 2011). Security and safety procedures should be a total package that includes impacts on the environment and its people (Coaffee, 2008). This why discussions that centres on sustainable development must take political resilience with security as the major factor integrated into economic, environmental and social issues.

2.4. National and Political Security

One of the first definitions of ‘national security’, belonging to the period of Cold War and given by an American political scientist Lasswell (1950, p.75) who stated, “The distinctive meaning of national security means freedom from foreign dictation”. This definition demonstrates different enabling and broader connotations to the term ‘national security’. Thereby, another security-related worldview that originates from liberal-institutional conceptualisation of international relations that sees the world more and more shaped by order and co-operation

and less like conflict and anarchy. According to this new paradigm, the probability of interstate aggressions seemed minimal, attacking becoming an exception when compared to earlier times when aggression was considered a rule in international life. However, this makes the states to view any predatory attack as backward, useless, and most probably provocative. Consequently, Charles Maier (1990) proposed a new definition for national security and specified, "It is best described as a capacity to control those domestic and foreign conditions that the public opinion of a given community believes necessary to enjoy its own self-determination or autonomy, prosperity and well-being". Richard Ullman's (1983) definition of national security stems from the same period and it highlights the ability to maintain or expand the quality of life of the inhabitants of a state and the range of policy choices available to the government. Already these two definitions from the 1990ies demonstrate the importance of the population and their well-being as aims of national security, which have taken central roles during the last decades.

The political security aspect of national security depends on the effective political inclusion of disaffected groups and the human security of the citizenry. According to Wolfers (1962, pp.147-165), "Security, in an objective sense, measures the absence of threats to acquired values, in a subjective sense, the absence of fear that such values will be attacked." In the neighbourhood of Russian Federation, Estonia's national security has been an essential topic since 1991 when re-independence was gained through the Singing Revolution (Lauristin and Vihalemm, 1998; Rakfeldt, 2015). While for Estonians (Estonian-speakers) of the country, the newly gained independence was a part of self-actualization, however, for most of the Russian-speaking population, it meant losing the privileged status they had in the former Soviet Union. Consequently, their status turned to a minority in a small independent country that opposed the values and attitudes that were common in the ex-Soviet Union. In addition, the status of Russian language changed in 1989 when Estonian language law was adopted and Estonian was declared in Estonia as the only national language for public and private services communication. These changes were shocking for most Russian speakers, which provoked several protests and actions in Tallinn and Ida-Virumaa County.

The largest concentration of settlement of Russian-speakers was (and is) in bigger industrial cities and towns of Estonia (Tallinn, Narva, Kohtla-Järve, Jõhvi and Sillamäe). Even though the Russian-speakers organised themselves into several Russians-oriented parties in Estonia, these activities were not significant in the long term as these parties were poorly financed, they ended up not getting significant votes at the parliamentary level. Nevertheless, the Estonian Centre Party was able to attract votes from most of the Russian-speakers in later decades and meanwhile, Russian-speaker Estonians together with Estonian-speaking pensioners formed the majority of Centre Party supporters (Lauristin and Kallas, 2008). The representation of the Centre Party has provided the Russian-speakers of Tallinn and Ida-Virumaa County a strong feeling of participation in the Estonian society since in municipal elections it is possible to vote after 2-years registration in the municipality without being Estonian citizen.

After the start of the Ukrainian crisis in 2014, the Estonian Government put together a special "Ida-Virumaa Action Plan 2015-2020" which was prepared by the Ministry of Internal Affairs and later updated and monitored by the Ministry of Financial Affairs (Ida-Virumaa Tegevuskava, 2016). The action plan supports the development of Ida-Virumaa County as of a region of Estonia that is economically and strategically significant. It highlights Ida-Virumaa as a region of great entrepreneurial and labour market possibilities. Besides, the GDP regional growth has been one of the highest in Estonia and the growth of incomes has been among the highest during 2007-2017. Additionally, the cargo handling volume at Sillamäe port increased significantly since the opening in 2005 to 2013 and reached 8 million tonnes a year. Nevertheless, Ida-Virumaa still lags behind when compared to other counties by several socio-economic indicators. This region is the county with the fastest diminishing and ageing population. Between 2001 and 2011, the county lost 17% of its population and these losses have been especially dramatic in the cities. According to prognoses by Estonian Statistics Office, the population will decrease by more 27% by 2040 (ibid.). The share of children under 14 years and youth in the population is only

14%, which is the lowest in Estonia. According to prognoses, this can even decrease by 2040 to 10% making its job market pressure index the least favourable in Estonia. During the next 10 years, more people will retire and leave the job market when compared to those who enter the market. The ratio will be 6 new employees instead of 10 persons who will leave for the pension. Furthermore, the county is the highest by the share of the population who live in relative poverty about 30% (2011). (ibid.)

3. Methodology

The research methodology is based on semi-structured interviews together with a small-scale survey of experts, a case study, and a further exploration of potential regional development options for North-Eastern Estonia to overcome possible economic difficulties and to strengthen the social coherence in the frame of the Estonian Smart Specialisation strategy. The case study focuses on the activities of the maritime fuel company Viru Keemia Grupp AS (VKG) located in Kohtla-Järve in Ida-Virumaa with the aim of studying how the company's business activities were affected by the sulphur emission regulations.

VKG was used as a single study unit since a case study is a type of research that investigates an individual, community or group to answer a specific question by seeking evidence that lies in the case setting (Gillham, B., 2000). During the years 2016 and 2017, data were collected in the frame of the EU project "EnviSuM" from the company's records, the yearly financial statement of the company, and from regional stakeholders. Face-to-face structured interviews were made in October 2016 with the company's director of sales and the product development manager. During this time, the authors had also several interactions with VKG employees from administration and production department. Additionally, on-site observation of the company's activities was made together with a tour of the production site for a first-hand experience.

Knowing that knowledge and understanding of how the environment impacts any business decision is key to the growth of any company (Fleisher and Bensoussan, 2003), VKG's SWOT analysis was carried out through a brainstorming session as a diagnostic technique. The interview data together with the information from the brainstorming session was then used to evaluate VKG's strategic position and to analyse its business profile vis-à-vis a highly volatile and competitive market to draw out different suitable strategic investment options for VKG since successful value propositions are said to be embedded in great business models (Osterwalder and Pigneur, 2009).

In addition, the research involved 10 independent regional development experts from public administration, business and science regarding different options for regional development strategies for Ida-Virumaa region. The experts provided also their assessments and comments to obtain a multifactorial evaluation of different development paths for the region. The empiric measures comprised a survey, which was filled by the above-mentioned experts and which was analysed together with the outcome of the semi-structured interviews by using qualitative and quantitative methods.

4. Results

4.1. Case Study: Viru Keemia Grupp

The subject case, Viru Keemia Grupp AS (VKG), is one of the largest Estonian companies and a producer of oil shale, which has a sulphur content that exceeds both the SECA and the global sulphur emissions limit. Up until 2015, VKG was able to produce oil shale as bunker fuel without restraints. Due to the recent MARPOL regulations, the company has the challenge of producing the stricter sulphur reduction of 0.5%. In order to meet

the demand of the new regulations and to persist in a highly competitive market, going forward, VKG must make tough and strategic business decisions linked to high investments and serious financial risks in the maritime fuel market.

In 2015, VKG's contribution to the state budget of Estonia was up to €35 million and Company's total turnover was €167 million of which €87 million was related to business activities from oil shale alone. VKG initially started as a oil shale producer but have in over the years expanded and diversified its value chain to about 10 enterprises: oil, heat and power generation, heat distribution, electricity distribution, power system construction, oil shale mining, cinder blocks production, metal structures, pipelines and pressure equipment production, logistics, assemble and repair companies. As at 2015, VKG has employed over 2100 employees with a monthly average salary of 1 390 € which much higher than the average monthly salary in Ida-Virumaa County of 863€ (SYBE, 2016; Estonia: 1065€; VKG, 2015).

The oil shale (raw material) in its solid state is extracted from underground mine of VKG Ojamaa mining site. Over 3.4 million tonnes of commercial oil shale of both fine and coarse grade is produced annually from Ojamaa mining activities. The produced oil shale is useful as a quality-improving supplement for HFO or diesel supplement in industrial boilers and furnaces. After mining, oil shale is transported to Kohtla-Järve for processing in approximately 52 minutes with a 12.5 km conveyor (a piece of mechanical handling equipment that transports heavy and bulky materials from one end of location to another at production sites). VKG uses a thermal treatment technology where about 50-57% of oil shale energy is converted into liquid product (oil shale) energy while about 15-17% of oil shale energy is converted to gaseous by-product (waste gas) energy. A specific heat recovery process adds another 7-8% to the energy yield and the production of the solid by-products (mainly coke products) adds about 4 % energy yield.

The majority of VKG oil shale customers are some of the largest oil traders in the world. VKG Transport, a VKG subsidiary is responsible for its logistics and uses freight on board (FOB) - delivery for most of its distribution activities. The distribution process starts from the production site through the rail, which transports the oil shale directly to the port where tankers can pick for delivery to Rotterdam. Currently, there are marginal sales of VKG products to refineries; however, the majority of the liquid product mass is blended directly into product bunker fuel. Although VKG sells its fuel directly to oil traders and not to the end-users, considering the sulphur content of 0.8% as average in oil shale products, there might be a negligible possibility that the product is being used in SECA bunker fuel blend. Apart from its high sulphur content fuel by the SECA sulphur regulation, oil shale has a viscosity-density relationship preferable for specific purposes especially for improving HFO flow properties and pour point. This is one of the key selling points of oil shale but it does not separate VKG from the realities of the evolution in bunkering fuel and the regulations that surround it.

The oil shale industry is a subject of several controversial discussions in Estonia due to the high ecological impacts comprising of high emission of CO₂, mining and groundwater issues (Gavrilova, et al., 2005, 2010). Consequently, VKG as an oil production company is subjected to diverse environmental laws and regulations have to operate a centralised environmental department (ED) that provides services to all subsidiaries in VKG group. Because of its industrious promotion of environmental awareness activities, VKG has been consistently awarded "The Responsible Estonian Business" from 2010 to 2015. VKG intensive investments in the environmental causes had enabled a significant reduction in ecological footprint. About a €100 Million out of the €900 million investments VKG had made over the years on environmental related activities.

As a response to the SECA regulation, VKG came ahead with a refinery project that was in the pipeline before the SECA regulations. The feasibility study on own refinery building and bunker fuel market change research cost VKG about €5.5 million. Business wise, running a refinery would have meant a product innovation that will yield Euro V Diesel (a majority of the production), 0.1% sulphur marine fuel oil and stabilised naphtha outputs.

However, the outcome of the research could not dispel the uncertainties that surrounded the 2015 sulphur regulations and the market reaction to the sulphur regulations. The feasibility studies also showed that the refinery for the raw material processing capacity of 133% VKG oil shale production will cost a staggering sum of €400 Million coupled with the 5% depreciation of €20 Million annually making the management of the company to putting the refinery project on hold. The risk is further magnified with VKG’s constant struggle with uncompetitive and high fixed costs of its fuel production when compared to crude oil and the downward fluctuation of the fuel price.

A look at the financial statement of VKG between 2005 and 2015 shows the sizeable contribution of oil shale to the annual turnovers, although 2015 shows a decrease in oil shale contribution. Also for the first time in 10 years, VKG recorded a loss in 2015. One logical and obvious explanation for this occurrence is that oil price has fallen drastically, a bitter pill any operating oil company have had to swallow. A further look also shows the company’s investment in 2015 was a lower percentage of the annual turnover (19.5%) when compared to previous years.

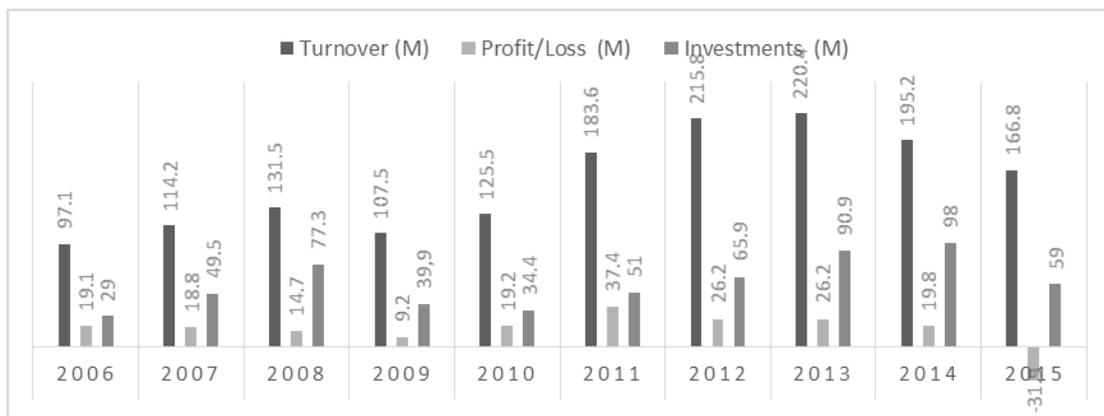


Fig. 1. VKG’s financial statement (2005-2015)

Source: Authors’ construction based on VKG AS 2015 Financial statements

Due to the new global sulphur emission cap from 2020, VKG has found itself in a position where it must make the assessment on the impact of sulphur regulations on the marketability of its oil products post 2020 and going forward on the most feasible alternative for its conformity with the regulations. Thus, VKG is faced with two major challenge; first, the fuel price collapse and its highly volatile market and second, the sulphur emission regulations compliance investments. Realistically, VKG could strategically choose from five investment portfolios. These are upward vertical integration, products upgrade, hydrodesulphurisation, and product discount and process innovation.

1) *Upward vertical integration*: Blending VKG oil shale with the 0.1% MGO or other low-sulphur content fuel-an upward vertical integration in its supply chain process. In this case, VKG will sell directly to its suppliers and will solely be in charge of how these products are supplied. With this action, VKG may likely be able to increase its share in the market by minimising the bottlenecks created by intermediaries and reduce its transaction costs, leading to an increase in its profits.

2) *Products Upgrade*: Building a new refinery, which could results in a change of marketable products portfolio for VKG such as V Diesel, 0.1% Sulphur marine fuel oil and stabilised naphtha. However, the costs involved would have been higher than the stated capital expenditure (CAPEX) of €400 million. For instance,

there will be additional investments in operational cost (OPEX) that involves employing more staff, maintenance, insurance, administration. The cost of operation without depreciation is estimated to be between €30-50 Million/year, which it will also depend on the price of natural gas and on the amount of the raw material (oil shale), processed.

3) *Hydrodesulphurisation*: The treatment (partial hydrogenation) of product-oil for sulphur removal (desulphurisation) is a chemical reaction between molecular hydrogen (H₂) and another compound or element in this case - sulphur, with the help of a catalyst (Kabe et al., 2000). Heavier distillates are usually broken down through this process. While this process will solve the sulphur content challenge, hydro-desulphurization of oil shale might cost VKG between €100 – 150 million capital investments.

4) *Product Discount*: VKG can continue marketing of its existing 0.8% w/w sulphur content product but with a discount to traders if the future spread between less 0.5% w/w sulphur fuel oil and less 0.1% w/w sulphur fuel oil.

5) *Process innovation*: Process innovation, an implementation of a significantly improved production method (Utterback, 1994) will increase and improve VKG efficiency (energy efficiency, a mass yield of products and labour productivity) as a key factor for sustainability post-2020 global sulphur cap.

Olaniyi and Viirmäe (2016) empirically assessed the investment portfolio of VKG and found out that there are only two options with a positive return on investment, namely the hydrodesulphurisation and the product upgrade and both options are equipped with a relatively high risk related to the future oil price and the price spread between oil and other maritime fuels. By comparing both options, it turns out that hydrodesulphurisation has the highest return on investment when compared to product upgrade it enjoys a lower risk so that the hydrodesulphurisation investment looks like the most favourable option for VKG. Hydrodesulphurisation option is related to necessary investment costs of €100 – €150 million which are unfortunately is linked to a financing problem due to high risks and appearing losses in the financial statement from 2015. The hydrodesulphurisation option challenge is also linked to oil shale resource allocation that is smaller than VKG processing capacity so that VKG unable to meet up to 100% of its oil shale production capacity (Olaniyi & Viirmäe, 2016). This problem could be solved by the cooperation of the regional oil shale companies, which are competing currently.

4.2. Political Options for Eastern Estonia

In the last 26 years, Tallinn as the capital has successfully reorganised its structure and industry and a lot of population (incl. Russians-speakers and others) have gotten new jobs in the same field of industry or have had the possibilities to choose between other options (e.g. service, transport, logistics). At the same time, the situation of Russian speakers in North-Eastern Estonia has not changed very much although several changes in the economic structure of this Ida-Virumaa county have appeared. Russian-speakers of Ida-Virumaa form majority of the population of Narva, Kohtla-Järve, Kiviõli and Jõhvi. The Estonian government has originated several initiatives for Ida-Virumaa county, e.g. supporting entrepreneurship, teaching Estonian language (free courses and paid courses), the governments in 1990-s appointed to Ida-Virumaa special regional public officers. At the same time, because of the transformation and major changes in the Estonian and Russian economy, previous orders for Ida-Virumaa factories (e.g. Kreenholm Manufacture, Baltijets) to Russia and other parts of the CIS stopped. Because of this, the main available jobs for Ida-Viru population remained in the oil shale industry that produced in addition to raw oil shale for the industry, electricity nation-wide and heat for the consumption of the county. Because of privatization of Ida-Virumaa plants (e.g. Kreenholm), the rise of global competitiveness, automation, lowered oil price, global economic and financial crisis, crises in Russian economy the diminishing demand for workers in the last century quarter has caused tremendous staff lay-off in Ida-Virumaa (Altosaar, 2014).

This led the county to have one of the highest out-migration indicators in Estonia. Several sociological surveys have shown that a lot of Russian-speaking people feel quite deprived and abandoned in Ida-Virumaa, especially those who have lost their jobs and have given up to look for new opportunities. Their mobility is quite low as their

readiness to look for jobs outside their county. This can be because of their insufficient use of Estonian language that is currently a requirement in almost any type of employment. Because of their linguistic limitation and their habits from Soviet time or childhood, they are used to Russian TV channels, that are air biased and negative news and programs on the events in Estonia, European Union and in the West in general. This propaganda particularly fuels their discontentment in their desperate situation. In 2009, the government set up an aim to create 4,400 new jobs in a 10-year plan based on oil shale industry-related fields. For now, this plan has only fulfilled about 10 percent of the proposed number (Gamzejev, 2018).

At the beginning of 2018 the low oil price put an economic pressure on the oil shale sector and in addition to that, the SECA regulations push the sector into a strategic trap because starting from 2020 big parts of the products portfolio, namely the production of maritime bunker oil, will have to change making demand for expensive restructuring money. Related loans are complicated to access because already the 2015 annual report showed a loss and the low sulphur fuel regulations bedevil the access to fresh capital for the company. Additional discussions concerning ecological and sustainability issues are making the situation even more complicated so that it seems that without political support and guarantees, the situation cannot be positively changed. By taking under the account, the case study of Viru Keemia Grupp the Estonian political authorities possess a number of options on how to deal with the oil shale industry in North-Eastern Estonia. All options are linked to specific chances and risks, which will be discussed in the list of the following options.

One of the most recent plans is the establishment of Ida-Virumaa County Industrial Areas Development Foundation (IVIA) as a development organisation created by the public sector, founded by the Estonian Ministry of Economic Affairs and Communications, the City of Narva, the City of Kohtla-Järve, the City of Kiviõli and Jõhvi municipality. It is set up to develop five industrial and business parks in Ida-Virumaa County, being the owner of the property with supporting infrastructure. The goal of this publicly founded organisation is to attract new industrial and logistics companies thereby creating new workplaces. (IVIA, 2018) By 2018, several industry projects started and investments started coming in for the four planned industry parks in Jõhvi, Narva, Kohtla-Järve and Kiviõli. According to Teet Kuusmik, a board member of IVIA, in his interview to Estonian Radio on 16.01.2018 (ERR, 2018a,b), the expectation is that during 2018-2020 they would have created around 1,500 new jobs in North-Eastern Estonia.

At the end of February 2018, VKG announced that they managed in 2017 to mine oil shale more than ever - 4.1 million tonnes and 535,000 tonnes of oil shale were produced from the ore. Days later Estonian national energy supplier Eesti Energia published their achievements: 16 million tonnes of oil shale was mined that was used for 9 TWh electricity and 395,000 tonnes oil shale. Despite the competition between these two companies, Estonia is one of the few states in EU that can cover its energy demand using domestic resources, also electricity and oil shale is used for earning income from the export. If the exploitation of oil shale continues in the same way and in the same amount, it can last for 50-100 more years (Gamzejev, 2018).

Based on the expert interviews from 2017 different regional development strategies elaborated that resulted in five future strategies in total. In March-April 2018 10 regional and over-regional experts were invited to participate in a survey which allowed the assessment of these strategies concerning economic, ecologic and social sustainability as well as security. The analysis of the expert interviews led to five regional development strategies for Ida-Virumaa region:

The 1st option concerns the continuation of the current situation without any specific activities which are described as option 1 under the title of "no action". This means that Ida-Virumaa's as an economic area together with its industry should be freed from transactions and intervention by Estonian government like regulations and subsidies. This strategy, although questionable, leads to total self-regulation, called among economists *laissez-faire* (Rogers, 2000).

The 2nd option is subsumed under the title "reduce taxes", i.e. to alleviate the tax rates and the public charges for oil shale industry which mainly let benefit Ida-Virumaa region but which is linked to a couple of complex political questions. First, it has to be mentioned that the Estonian oil shale industry consists of public as well as of private companies so that alleviation of public fees can be considered as a subvention of specific business sectors, which will cause problems with national business groups as well as with EU regulations.

The 3rd option is not related to direct financial transactions of the public sector. The public level, in this case, guarantees the needed investment of the oil shale industry and represents an often used instrument of industry policy in other EU countries like already appeared in shipbuilding or mining sector.

The 4th option is to take money from other sources like ERDF budgets to invest in specifically promising business sectors for Ida-Virumaa County. This represents an active industrial policy and is not new for EU countries. After the financial and economic crisis in 2009, many national and regional authorities rediscovered industrialisation as a major concern for the sustainable well-being and invested big budgets into industrial infrastructure (Prause, 2015).

The 5th option consists of the qualification of the regional workforce in order to make the region more interesting for foreign direct investments and to attract so new companies and even business sectors. Historically, Eastern Estonia and especially the Russian-speaking population has a high reputation as an industrial workforce with a focus on special branches comprising the textile and metal industry as well as logistics. The existing skill base is suitable for use and development to prepare the human capital for the needs of smart production and logistics. The necessary financial earnings can be achieved using the ESF resources as well as public revenues from oil shale industry.

5. Findings and Discussion

5.1 Discussion of the Strategies

The experts who analysed all mentioned options added a set of valuable comments to the five different regional development strategies. The most often mentioned comments related to the first strategy “**no action**” were pointing out about the future when “...using of oil shale decreases in any case, i.e. the unfiltered dust-burn pots will be closed down by 2024 and filtering of SO_x and NO_x by 2030-2035. This means that from today’s power production of 1800MWe power there will be kept by 2015 730MWe that consume oil shale instead of current 12 million tonnes merely 5-6 million tonnes a year and the number of jobs will decrease by ca. 3,000 workers. To some degree, Eesti Energia will compensate for this loss of jobs by building an oil production factory Enefit 280 by 2030.” The experts also estimate that the age of oil does not end at least during next 50 years, but economically it is very important to have oil shales post-production, in order to refine it similarly to other raw oils and for this purpose, the state should contribute much more into R&D. This view of the expert stresses more on the industry’s perspective using research & development initiative from the government as a solution for an impending crisis that can be caused by unemployment of current workforce of the area.

Current **taxation** according to the experts is the biggest burden for the companies. The reason for this is the abnormally high and unreal as pollution tax, as the Estonian pollution taxes are considered the most complex and the highest in the world and nowhere else would anyone find enterprises that pay pollution tax for using cooling water in condensation regime (Eesti Energia pays ca 8 million Euros a year). Comparable pollution taxes do not exist in Europe, except Poland which collects money for storing mining waste, which causes problems for producers, because these costs represent fixed costs not depending on market prices or profits. Consequently, the pollution taxes are unfair and lowering the growth of the Estonian oil shale enterprises. This result seems to be an

Estonia specific because it contradicts with Gavrilova et al (2010) who claimed that most of the resource and environmental taxes for the oil shale industry are lower, in some cases very remarkably lower than for the other industries. Experts' opinions further highlighted that the most regrettable circumstance of North-Eastern Estonia in the context of taxation is not related to the collection pollution taxes but to the fact that only about 5% of taxes from oil shale industry actually come back to Ida-Virumaa. The rest is quite evenly distributed through the state budget and the Environmental Investment Centre (KIK) all over Estonia. One expert stressed that if 30% of the collected taxes (approximately 12 million Euros) could be redirected back to Ida-Virumaa as **guarantee** or investments for regional development, then, North-Eastern Estonian might be a prospering part of the European Union.

The experts agree that the idea of creating growth and new jobs with state **investments** is generous, but this approach has some limitations since the re-organisation process does not take place as fast as one might expect and is only partly controllable by the state. The example of Ida-Viru Industrial Areas, originated in 2014, shows that although the first plot for a new company was established in 2015, and now in 2018, despite the fact that 135 plots are ready and completed, only six plots are taken by companies providing 400 jobs and on two plots there are ongoing construction works. Expert concludes that this kind of scenario is largely dependent on economic conditions and on a large number of stakeholders like banks and investors. Complications in developing new businesses had been described also by data about lower overall entrepreneurial activity and density in the area (SYBE, 2016). New attempts to enliven entrepreneurship and business activities are may-be slow, but some progress is clearly visible.

Demand for high **Qualification** can be considered as well, but in practice, there should be also a real demand for the workforce rather than some lofty qualification. To some degree, it may work (in respect of mobile workforce), but the reality of Ida-Viru has been directed to the industry. Thereby, increasing the employment in the industry has been grounded. This is also one of the motivations of the state and a reason why Geological Survey of Estonia was established to investigate if other mineral resources of Estonia (phosphorite and argillite in Ida-Virumaa, iron ore in Jõhvi and elsewhere) can be possibly used. By that, if possible, create new highly paid jobs for those laid-off from oil shale sector. A general remark of the experts was that is complicated to keep a skilled workforce in a region without high technology and innovative companies since competitive salaries are necessary to prevent brain drain to highly developed areas. In this sense, Ida-Virumaa would compete with Tallinn, Estonian capital where the salaries are higher especially. To a great extent the relatively high wages in the energy sector and in mining in North-Eastern Estonia have avoided a stronger out-migration of the workforce.

4.2. Discussion of Survey Result

The ten experts answered besides the interviews also a survey on future regional development strategies for Ida-Virumaa and assessed the five different regional development strategies with respect to economic, ecologic and social sustainability as well as to security aspects. The statistical analysis of the expert survey revealed the five regional development strategies assessed by the experts and the analysis of variance showed significant differences between the answers of experts with a p-value of less than 1%. The experts fall into three different groups that can be characterized by group 1 (3 experts) which had an overall slightly negative view, group 2 (3 experts) which had a neutral overall view and group 3 (4 experts) which had a positive overall view.

The two regional development options "Investments" and "Qualification" gained the highest scores nearly on the same level, followed by the option "Guarantees" which scored also positive but only on a level of 25% of the two leading strategies. Negative assessments appeared only for the regional development options "No action" and "Taxation". When it comes to the impact of the different regional development strategies on the three sustainability dimensions and security it turned out that the highest scoring was measured for economic sustainability in case of the investment strategy followed by social sustainability for the qualification strategy.

The highest score for security appeared for the qualification strategy and surprisingly low was the score of the investment strategy on security. By taking a closer look at the two favourable strategies it turns out that the experts saw the investment option as the best possibility to generate economic and ecologic sustainability whereas the qualification options seem to be the favourable strategy to safeguard social sustainability and security.

Correlation analysis revealed relatively high similarities between the first three strategies 1-3 on one side and the last two strategies 4-5 on the other side and a relatively low correlation between the two blocks. In addition to that, there was a high correlation between social sustainability and security and a surprisingly low correlation between economy and security with the lowest correlation value of ca. 60%. These results raise the question if security for Ida-Virumaa is rather depending on the economic situation in the region like stated by the study of the International Centre for Defence and Security or if the social conditions are rather important for the loyalty of the Russian speaking Estonians (Kivirähk, 2014).

By considering the overall means of the four sustainability dimensions, economy has the highest value whereas they gave the lowest but positive value to ecology. This result allows two different observations, firstly the experts saw the highest potential for Ida-Virumaa County in the economic field and secondly that the ecologic perspective is still positive but represents the most controversial issue for the county. The medium means of social and security issues reveal a level of lower prosperity, which will, in any case, be improved after a sustainable economic development, takes place.

The final remarks should be expresses concerning risks for oil shale industry and depending effects on Ida-Virumaa. Kallemeets (2018) discussed the risks related to EU Emissions Trading System, which are currently low with no evidence that the European Union Allowances might rise in the near future. Yet, there is a high uncertainty about CO₂ prices in the emission trading systems causing minimal income for Estonia for not consuming the planned production volumes in oil shale industry. An additional risk represents the already mentioned requirements under MARPOL annex IV forcing that all marine bunker fuels to contain no more than 0.5% of sulphur by the year 2020 by keeping in mind that the average sulphur content of Estonian oil shale is 0.8%. Finally, in a low price scenario of 200€/t for HFO the Estonian oil shale industry is likely to fade out, whereas at a price range around 320€/t for HFO would be sustainable and even 450€/t for HFO would lead to substantial capacity increasing investments according to EY 2016 study (EY, 2016).

5. Conclusions

The Estonian oil shale industry represents an important national economic sector with high contributions to export, innovation and workplaces. Through falling oil prices and the enforcement of the SECA regulations in 2015, the Estonian oil shale sector has come heavily under pressure. The case study of Viru Keemia Grupp (VKG) shows losses in 2015 and a deeper analysis even reveals a strategic trap, which is linked to SECA regulations. In the current situation, the company cannot by themselves handle this crisis; hence, the question about political support appears.

For North-Eastern Estonia, especially for Ida-Virumaa County, oil shale industry plays an important role with a regional impact of about 50% on the workplaces and high contributions to regional income. Ida-Virumaa County is dominated by Russian-Estonians who are only weakly integrated into the Estonian society and who suffer from the highest regional unemployment rate in Estonia so that the economic situation of oil shale industry directly impacts the social cohesion. Despite the ongoing discussions on the ecological impact of oil shale and the missing integration of the oil shale industry into Estonian smart specialisation strategy, the research shows that currently, the active support of Estonian oil shale industry brings more advantages than disadvantages.

Concerning the long-term development, the research explored and discussed different regional development strategies for North-Eastern Estonian which all have their strengths and weaknesses and which were assessed by an expert group. Only the investment strategy and qualification strategy have the potential to lead to substantial improvements in sustainability, social cohesion and security in the region. Nevertheless, the dominating oil shale industry is fading out with the decline of fossil energy so that new regional development strategies are needed for Ida-Virumaa County keep prosperity and to safeguard social coherence in North-Eastern Estonia.

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MANAGING CONTRADICTION AND SUSTAINING SUSTAINABILITY IN INTER ORGANIZATIONAL NETWORKS THROUGH LEADERSHIP: A CASE STUDY

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Abstract. The broadly-based literature on organizational studies has concentrated mainly on resolving organizational issues through acquisition of resources, decreasing transaction costs and incentives. In other words, scholars commonly examine the organization itself, at the expense of inter-organizational relations. However, with the emergence of “network governance” organizations are no longer to be considered as isolated but rather as actors that actively seek to maintain themselves in a given situation by collaborating with other actors, forming organizational networks. This study utilizes a network perspective to examine the influence of leadership on management of unity/diversity contradiction in educational program implementation. A deductive approach is used to generate propositions by analyzing implementation efforts in respect of educational program in Azerbaijan: “State Program on education of Azerbaijan youth abroad in the years 2007-2015”. The analysis examined a research question: How do leadership activities affect to manage unity/diversity contradiction in network? This question was addressed using qualitative method. In education program, unity and diversity were found to exert an important influence on success of network. At the implementation level, understanding of unity and diversity concept helps network managers to attract diverse actors to the network and unite them around network’s goal. The coordinating units of network manage the unity/diversity contradiction by activating member organizations, facilitating interaction, framing the structure and mobilizing network members. Thus, effective management of contradiction increases the network’s capacity to access information, financial resources and experiences.

Keywords: inter-organizational network; contradiction; sustainability; leadership

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1. Introduction

Educational programs play a significant role in the creation of high level human resources; in the last fifteen to twenty years, most such programs have been implemented through inter-organizational networks (Hjern & Porter, 1981; O’Toole & Montjoy, 1984; Kickert et al., 1997; Hall & O’Toole, 2000; Monni et al., 2018). This may be

due to the growth of social and economic complexity or problems nowadays known as “wicked” (Rittel & Webber, 1973; Borisov et al., 2018), challenging the capacity of government to respond.

Increasing complexity requires government to introduce new forms of organizational management in order to produce complex solutions. For this reason, governments look to solve major social and educational problems by implementing large-scale programs under a multi-organizational arrangement or network. Scholars have shown that multi-organizational or network-based management is a more adequate way of resolving issues (Thurmaier & Wood, 2002; McGuire, 2006; Le Roux, Kelly, Sanjay, & Pandey, 2010, Mura et al., 2017).

Kettl (2002) noted that many complex modern problems do not fit within organizational boundaries and that multi-organizational arrangements are needed to address such problems. Network-type program implementation involves configuration of governmental, non-governmental, and private organizations, and of formal structures and institutionalized rules and norms. One important factor in network-based implementation of programs is collaboration among organizations, which creates opportunities for pooling of limited resources (Huxam & Vangen, 2005). Management mechanisms in such networks are designed to solve problems by collective action, and collaboration in networks therefore enables organizations to solve problems that cannot be solved by a single organization alone (McGuire & Agranoff, 2010); this view is especially strong in program implementation. However, collaboration in networks is not an easy task, and more than 50% of organizational alliances fail (Kelly & Schaan, 2002; Park & Ungson, 2001).

Scholars suggest that failures and difficulties in network collaboration arise from complexity in the network (Park & Ungson, 2001) and from the dynamic and ambiguous nature of collaborations (Huxham, 2003). One of the main reasons for complexity in network is inherent contradiction between unity and diversity. Network need to be formed from diverse members in order to successfully reach its goal and yet need to be united. The unity and diversity contradiction represents a paradox of belonging—when individuals or organizations naturally strive for both self-expression and collective partnership. Scholars identified the contradictory view of unity and diversity in leadership, “how people request autonomy (diversity) while demanding control of anything dependent on them (unity)” (Carranza, 2008). On the one hand, high unification of similar organizations in network fails to achieve coalition. On the other hand, high diversity slows progress to achieve network’s goals, since generation of familiarity and trust take time.

Overcoming the challenges of contradiction in network requires effective management and leadership. There are several cross-sectoral approaches to leadership (e.g., power-influence, traits-skills, situational, and reciprocal). However, the present study examines leadership within the boundaries of inter-organizational networks. Here, leadership refers to “network leadership”—the activities network managers engage in while directing and coordinating the work of group, such as structuring work relationships (Bass, 2008), and in particular, the capacity to bring parties to the table by using four distinct categories of leadership activities; activation, facilitation, framing, and mobilization.

The purpose of this study is to understand the challenges and opportunities faced by network managers in trying to manage diverse relationships with participating organizations and unite them. This research will examine inter-organizational arrangements on “State Program on education of Azerbaijan youth abroad in the years 2007-2015”, which extensively engaged in capacity building of youth, improving socio – economical condition in Azerbaijan. By analyzing existence of unity/diversity contradiction the aim is to uncover the role of leadership on management of this contradiction as a program implementation strategy. One specific question guide this research: How do leadership activities affect to manage unity/diversity contradiction in network?

In examining the research question, this study aims to explain how new concepts of “leadership” influence on contradiction management and how leaders activate, facilitate, frame, and mobilize network members. Therefore,

the research question aims to test how four leadership activities—activation, facilitation, framing, and mobilization—separately influence unity/diversity contradiction in networks.

2. Definition of Network

Any study of networks must clearly begin from a definition of the term “network.” In general, there is no unique definition of a network, which has been characterized from divergent perspectives. Grandori and Soda (1995) explained the term from an economic perspective, placing networks at the core of organization theory. They described inter-organizational networks in terms of the wide variety of possible relationships among organizations, such as joint ventures, strategic alliances, and consortia. More specifically, the inter-organizational network has been explained as an “institutional form of coordinating, governing and economic exchange relations among actors” (Ebers, 1997). The main notion here is that there is no common ownership in a network, and organizations make their own decisions.

Agranoff and McGuire (2001) characterized networks as “multi-organizational arrangements to solve problems that cannot be achieved, or achieved easily, by a single organization.” At its simplest, this definition approaches networks from a public management perspective. Similarly, Bryson et al., (2006) defined networks as “cross-sectoral collaboration...the linking or sharing of information, resources, activities and capabilities by organizations in two or more sectors to achieve an outcome that could not be achieved by organizations in one sector separately”. Provan, Fish, and Sydow (2007) and Weber and Khademian (2008) defined networks from the perspective of relationships. According to Weber and Khademian, networks are established by organizations, individuals, and groups for exchange of relations (Weber & Khademian, 2008).

From a collaboration perspective, Liebeskind, Oliver, Zucker, and Brewer (1996) considered trust and mutual interests as the main components of networks understood as a long-term interchange based on trust and mutual interests. Kreiner and Schultz (1993) and Dubini and Aldrich (1991) defined networks in terms of “collaboration among individuals and organizations.” Gray and Wood suggested that collaboration occurs “when a group of autonomous stakeholders of a problem domain engage in an interactive process, using shared rules, norms, and structures, to act or decide on issues related to that domain” (Gray and Wood, 1991).

Organizations are linked together in different ways and for different purposes. Each such arrangement has its own targets, and the relevant definition of a network may differ accordingly. Despite differences across the various literatures, these definitions share several common characteristics. Almost all definitions note freedom of decision-making in participating organizations, repetitive interactions among actors, and primary reliance on collaboration. In this light and for present purposes, the term “network” is used exclusively here to refer to “*a number of interdependent organizations are gathered for special purposes, which negotiate to each other and share information, resources and activities*”. The present study defines networks from a public perspective, where the targets of participating organizations were to extensively engage in capacity building of youth, improving socio – economical condition in Azerbaijan. The above definition captures how these organizations come together and how they act in pursuit of their goals.

3. Unity and diversity contradiction in network

Whether within the public or private sectors, managing inter-organizational networks is an inherently difficult task. According to Brass et al, (2004) in inter-organizational network, members build long-term cooperative relationship by retaining control over its own resources as well as decide how to use it. Collaborative relationship among members have also been studied under inter-organizational relationship, coalitions, partnership, collaborative agreements (Provan, Fish, and Sydow, 2007). One of the specific types of inter-organizational network called as “goal-directed network”, which encompasses “groups of three or more legally autonomous

organizations that work together to achieve not only their own goals but also a collective goal” (Provan and Kenis, 2008). In order to govern members of network effectively this type of network forge a special governing body, which called as “network administrative organization” (NAO) (Provan and Kenis, 2008). Within network, NAO functioning as leader and it is responsibility of NAO’s staff to manage tension generated by the simultaneous demands to sustain unity (bringing organizations together to function in accord) and diversity (drawing out unique contributions based on members differences).

The concept of unity in inter-organizational networks refers to the state of being in accord, without deviation. Some network researchers explain unity based on self-interest paradigm. They assume that, in inter-organizational network, organizations are eager to unite in order to maximize their preferences and desires. Emerson (1972) examined unity perspective based on power dependence theory. He argued that groups in inter-organizational network unite because of to exchange valued resources. Marwell & Oliver (1993), explain unity in network as “mutual interests and the possibility of benefits from coordinated action”. Samuelson (1954), developed public goods theory, which assume that individual or groups unite not because to maximize self-interest, instead, the motivation to forge unity is to maximize collective ability of group to leverage resources and mobilize for collective action.

Unlike concept of unity, diversity refers to “the demographic and cultural characteristics of an organization’s labor force, customers, competitors, or population at large” (Post, 2007). In other words, diversity is a structural and institutional traits within and across organizations. There are different approaches to diversity in organizational and inter-organizational levels. According to Van Knippenberg et al., (2004); Williams & O’Reilly, (1998), heterogeneous groups have the potential to produce better solutions than homogeneous groups. In a diverse group relationships among people with different sets of contacts, information and resources generate creative problem solving, decision-making and idea creation. Homogeneous groups have limited recourses and perspectives compare to heterogeneous groups thus it makes barrier for their performance.

Moreover, theories such as social identification, social categorization, and similarity attraction concentrate on negative sites of diversity. The main argument of these theories is that similarity of values and attributes on demographic variables improve attraction, therefore, people prefer to work with those similar to themselves. Basic argument underlying in social categorization theory is that people differentiate themselves with others based on social categories such as, age, gender and they are more interested to interact with in-group members than out-group members. Furthermore, similarity-attraction theory implies that interpersonal similarity such as values and attitudes are important determinant of interpersonal attraction. According to this perspective, there is higher performance in a group, which members belong to the same social category than a group members who belong to various social categories (Van Knippenberg & Shippers, 2007).

In network literature based on several theories such as group behavior (Smith and Berg, 1987), collaborative behavior (Huxham 2003; Wood & Gray 1991), organizational behavior (Cyert & March 1963; Lawrence & Lorsch 1967), scholars identified some important contradictions such as, internal versus external legitimacy, flexibility versus stability and efficiency versus inclusiveness (Provan & Kenis, 2008). Although this study recognize abovementioned contradictions, it was another contradiction—that of unity versus diversity— is a driving force in NAO’s efforts to ensure collective action. Therefore, this study focus on a specific contradiction that the NAO must address to effectively govern the network: the unity-diversity contradiction.

Organizational and network literatures suggest that unity and diversity contradiction in network is characteristic of any organized effort, in small group collaboration as well as in inter-organizational relationships (Mintzberg, 1983; Poole & Van den Ven, 1989). Inter-organizational network management implies fragmentation and dependence at the same time. The central idea of fragmentation put importance on collaborative advantage of each partner to bring different resources to the network. Diversity, however, reveals tensions about collaboration

because of organizational differences (Huxham and Beech, 2003). Some scholars claim that diversity is reducing network performance (Sampson, 2007). However, in an effective inter-organizational network both unity and diversity are similarly important. Unity-diversity contradiction in networks mirrors the integration-differentiation duality managers of individual organizations face and must address strategically (Lawrence and Lorsch, 1967).

In network level, Provan and Kenis (2008) make correlation between unity-diversity and efficiency-inclusiveness tension. They link unity with efficiency and diversity with inclusiveness. In NAO if manager's priority is efficiency he/she would promote unity over diversity and inclusiveness. However, if a manager interested primarily with diversity, he/she would promote inclusiveness over efficiency. According to Mizrahi and Rosenthal (1993), unity-diversity tension may occur along with age, gender or ideological dimensions as well as along with power dimension, "where unity generates power for network but may be difficult to achieve due to power differences among members of network.

To sum up, based on reviewed literature this article claim that unity-diversity contradiction is a distinct contradiction in network governance not researched well by scholars. Therefore, this is a rare study to concentrate unity-diversity contradiction in case of "State Program on education of Azerbaijan youth abroad in the years 2007-2015".

4. Leadership in inter-organizational networks

Traditionally, the perceived characteristics of leaders include education, skills, intelligence, and personality, all of which are seen to contribute to making them leaders. Such approaches imply a hierarchical structure, but network leadership has other requirements. The main purpose of this section is to review the literature on leadership in network management in a collaborative context and to explore network leadership activities. This review will not encompass the entire field of leadership but will focus on those dimensions of management that are of specific relevance in achieving effective collaboration and efficient program implementation within a network.

According to McGuire and Silvia (2009), "leadership is the process of influencing others to understand and agree about what needs to be done and how it can be done effectively, and the process of facilitating of individual and collective efforts to accomplish the shared objectives". They distinguish leadership in organizational and network contexts, positing that these two are quite different; while organizational leadership is more task-oriented, network leadership is seen to be more people-oriented (Mc Guire & Silvia, 2009).

Some scholars (e.g., Bennis & Nanus, 1997; Northouse, 2007) have viewed leadership and management as different constructs. Bennis and Nanus (1997) stated that management is "doing things right" whereas leadership is "doing the right things." Similarly, Northouse (2007) described management as accomplishment of activities whereas leadership involves the ability to "influence others and create vision for change." From this perspective, Northouse (2007) defined network leadership as "a process whereby an individual influences a group of individuals to achieve a common goal." According to Novak (2008), possible approaches to leadership in networks include distributed, relational, and transformational approaches. Under the distributed approach, Pearce and Conger (2003) defined leadership as "shared leadership," involving "influence and leadership broadly distributed among a set of individuals" (Pearce & Conger, 2003). Houghton, Neck, and Manz (2003) proposed that the main factors for shared leadership are selection of appropriate team members, establishing group norms that support the new concept, empowering team members, and improvement of leadership skills. The relational approach defines leadership as a set of multilevel interdependencies and relations among individuals; more specifically, "leadership occurs in and through relationship and network of influence" (Fletcher & Kaufer, 2003). Unlike the distributed and relational approaches, the transformational view of leadership emphasizes individual qualities such as the personality and values of the leader and assumes that leadership occurs in a leader-follower context (Bono & Anderson, 2005). Lipman-Blumen's (1996) concept of "connective leadership" "focused on leaders' connections with others, both internally and externally.

It is also important to highlight that leadership is pivotal for successful collaboration. Bryson, Crosby, and Stone (2006) proposed two leadership positions: formal and informal, arguing that in order to become an effective leader, formal leaders-coordinators, co-chairs-need skills, commitment, personality and etc. Additionally, they categorize leaders as “sponsors” or “champions”; while sponsors are not closely involved in day-to-day work and are not active participants in collaboration, champions are actively involved in both (Bryson, Crosby, & Stone, 2006).

For this study, the core theoretical frameworks explaining leadership activities are those of McGuire and Agranoff (2010) and Huxham and Vangen (2005). Although the typology of activities differs, the functions are broadly similar. According to Agranoff and McGuire (2001), Vangen and Huxham (2004) networks entail four main leadership activities: activating, facilitating, framing, and mobilizing. The main purpose of activation is to achieve program goals through identification and incorporation of persons and resources (Hunter & Agranoff, 2008). In other words, selection of the “right players with right resources” for an effective network (McGuire & Agranoff, 2001), as echoed by McGuire and Silvia (2009). On this view, during selection of network members, managers must assess and tap potential members: “...activation is critical component of leadership because resources such as money, information, and expertise can be integrating mechanisms of networks” (McGuire & Silvia, 2009).

Facilitating refers to the enhancement of participation and managing inequalities in networks (Vangen & Huxham, 2004). Bartunek et al., (2000) distinguished two categories of leadership action: initiating (chosen mainly by traditional authoritative leaders) and facilitating (mostly preferred by participative or collaborative leaders). They emphasized the need for facilitating actions in highly complex situations to create favorable conditions for network members and to ensure strong interaction among participants. Successful facilitation ensures high collaboration among members, minimizing “informational blockages to cooperation” (McGuire & Silvia, 2009).

Framing aims to “...establish and influence the operative rules of network, influencing its prevailing values and norms and altering the perception of network participants” (Agranoff & McGuire, 2001). More specifically, this activity helps to establish a network identity and culture (Hunter & Agranoff, 2008). The main feature of this function is to create value in the network and then to communicate this value among network actors. By creating value, network leaders can strengthen mutual endeavor and processes of interaction and negotiation among participants. Without effective framing, there can be no value creation, and ultimately, no mutual understanding. By effective framing, leaders influence each participant, creating an effective working structure and a collective vision for the network, helping participants to understand its unique characteristics.

Finally, mobilizing aims to secure commitment and support network purposes (Agranoff & McGuire, 2001). By mobilizing organizations, “...leaders develop support for network processes from network participants and external stakeholders” (McGuire & Silvia, 2009). The main behaviors for this activity include maintaining network legitimacy and incentive-based motivation.

It is further argued that in each type of network, managers use different kinds of leadership activity—for instance, in voluntary networks, managers need to focus more on activation and framing activities than on facilitation and mobilizing. Applying these management functions and other behaviors, this study will seek to establish describe which activity (or activities) was more important in managing “State Program on education of Azerbaijan youth abroad in the years 2007-2015”.

5. Method

Given the complex, innovative, and under-researched character of this research topic and the nature of contradiction and leadership, an in-depth qualitative study yielding rich data is the most appropriate research methodology. Primary data for this study were collected by conducting questionnaire-based interviews. Data collection was shaped by the formal structures of Program; the coordinating unit and participating governmental, non-governmental, and private organizations were asked to respond to the questionnaire. Other data sources included scholarly works published in academic journals, books written by experts, official publications produced by government, NGOs and media sources of all types produced anywhere.

Interviews represent the main source of data for this study. In total, 20 interviews were conducted with 25 interviewees, including 5 managers, 12 organizational members, and 8 staff from the network coordination unit. Informants were interviewed in 5 group interviews and 5 individual interviews. Informants were selected from two groups: the coordination unit and member organizations.

Managers of the coordination unit provided broad information about leadership activities in the network. Coordination unit managers review the opinions and decisions of other members, making them important informants for present purposes. Staff members also provided important data about leadership and collaboration. By comparison with unit managers and staff, organizational members provided less information but some useful insights.

All group meetings were conducted in person. Interviews with coordination unit managers were also face-to-face. Because of confidentiality and complex problem solving responsibilities, all interviews with managers were face-to-face, which provided more informative responses to the questionnaire. Most organizational members' main concern was confidentiality (in relation to law and professional ethics) and after receiving those assurances, they provided broad and useful data about both networks.

Group interviews were conducted on the networks side. The first group interview involved six participants; after that, it was decided to limit group interviews to a maximum of three people as the first group interview was not time-efficient and interviewees were unable to maintain focus. One of the benefits of group interview was that group dynamics could be exploited as participants reflected on each other's inputs (Frey and Fontana, 1991).

Most of the interview questions in this study were open-ended, providing an opportunity to seek explanations beyond the initial responses. At the same time, it was important to avoid leading questions, which suggest a particular answer (Herman & Bentley, 1993). By avoiding use of closed and leading questions, it was possible to keep the conversation focused on the topic while allowing participants room to shape the content of the discussion.

The interviews were divided equally in two parts, each containing core questions. This structure facilitated in-depth and detailed answers. The first part was introductory, including greetings and opening questions to obtain general information about the interviewee's work, position, and responsibilities. The second part of the questionnaire concerned internal management of the network. In this section, to obtain detailed information, more time was spent with coordination unit managers than with the other two groups (members and staff). The second part of the questionnaire analyzed possible relationships between unity/diversity contradiction and leadership in education program.

All of the main interview questions were correlates of the research questions, and all provided broad information about the manager's leadership role in the network and its possible effects on collaboration. Most coordination unit managers had participated in previous government program networks, which enabled comparison of the government's current and previous networks.

5.1. Participant observation and documentation

The second method of data collection used in this study was observation and documentation. The main advantage of this method is the potential to explore what people say and what they think. According to Patton (Patton, 2002), this method enables the observer to see and discover which things people pay more attention and less attention to in a given setting (which helps to understand interactions) and to obtain information about critical issues that people prefer not to talk about.

Documents that are produced for purposes other than research, including newspapers, internal regulations, minutes of meetings, diaries, and websites, can also be used for research purposes. Corbetta identified some advantages of documents as research sources in that they make it possible to understand all stages of processes, they are often easy to access, and documentary information is not subject to subsequent distortion (Corbetta, 2003).

The observation and documentation process here involved reviewing minutes of meetings, unofficial talk, newspaper articles, press releases, meeting agendas, grant proposals, videotapes of presentations, and annual reports. During this research, over 70 documents related to external public sector activities and to internal management of networks, including regulations, ministerial rules, statutes, minutes of meetings, and other recordings were reviewed, along with observation of 20 major events.

Observation and document analysis made it possible to interact effectively with network members and to obtain in-depth views from different perspectives regarding collaboration in the network. It was also possible to interpret these views to identify common trends from which conclusions and a best practice model could be constructed in relation to program implementation in Azerbaijan, identifying key participants, their activities, and key issues in the networks.

5.2. Validity and Reliability

In general, when conducting a qualitative research, validity and reliability are an important factor to take into consideration since they help to identify the objectivity of the research. According to Bryman and Bell (Bryman&Bell, 2012), reliability and validity are separated into internal and external concepts. Internal reliability is typically assesses whether there is enough researcher in the study group thus the observer can agree as regards to what they see and hear. External reliability refers to “what extent a research can be completed again with results comparable to the original study” (Grimsholm&Poblete, 2010). Willis argues that main purpose of internal and external validity is to evaluate a research study’s quality In other words, internal validity checks if the research can be duplicated with the same outcomes for another researcher. External validity, on the other hand, means to what extent findings can be applicable on other researches (Willis, 2007).

Validity of data in this research was enhanced through triangulation. Triangulation is a method to check and establish validity by analyzing research question from multiply perceptive and also usually used in qualitative research to strengthen reliability. In this study triangulation was done through across information sources-interviews in this case and document analysis. At the same time, triangulation also allow to understand of state programs implementation.

On the other hand, all interviews has been recorded and transcribed and sent back to the interviewees for additional control. This also decrease the possibilities of manipulating interview data.

Moreover, in order to enhance the reliability of the research much time was spent to explain questions to interviewees, which gave opportunity for deep and *clear* understanding. A conscious effort was made to interview

both higher level and lower level officials, urban and rural participants and with people from variety of cultural and ethnic backgrounds. This diverse and large number of interviewing gave me an ability to not to rely on a single informant whose information might be unreliable.

6. Findings

Firstly, this research argued that unity and diversity of the network are important with respect to the success of network. High level of diversity in a network may create tensions as opposing ideas arise from differences in organizational values, cultures and goals. Therefore, unmanaged diversity may cause conflict and disunity among network member organizations. Successful networks need both unity and diversity simultaneously. Network in this study managed unity/diversity contradiction by uniting member organizations around metagoal, common identity and shared experience. Network sustained diversity along certain dimensions and generated unity along others and in this way they could deal with unity/diversity contradiction. By investigating “State Program on education of Azerbaijan youth abroad in the years 2007-2015” network, this research finds that unification around metagoal, experience and identity and sustaining diversity around several dimensions- organizational size, geographical difference, type of clients and so on. - is key to manage unity/diversity contradiction effectively and increase network effectiveness.

Second, leadership concept in this research addresses the role of coordinating unit of the network to resolve unity/diversity contradiction. This research launches a new role for Network Administration Organization (coordinating unit in this case) playing a leadership role to facilitate program implementation and intervene into the tensions. New leadership concept constituting features of network leadership study, is not meant to exclude network leaders existing roles, rather supplementing them.

In order to improve capacity of youth in Azerbaijan network type program implementation is important. Managers of network need to co-operate with member organizations. Moreover, they need to perceive tensions or contradiction in network and activate, facilitate, frame and mobilize members and to arrange relation-building to influence contradiction. Before activating right and diverse members, managers should take into account that this diversity will become disunity if it is not managed well. Facilitating in network constitutes relationship-building among members and these relationships contribute to opening the door between NAO and participant organizations, which can constitute the foundation of cooperation. Setting up network’s values, norms and procedures are important in managing unity/diversity contradiction as it forms base for interaction. In network (or State Program on education of Azerbaijan youth abroad in the years 2007-2015), general norms and procedures are created by coordinating unit. Framing build interaction among members and therefore, it is important in managing the unity/diversity contradiction. Furthermore, effective mobilizing is fostering trust among network members and to coordinate diversity. Mobilizing helps to move the network forward toward achieving its targets and builds support.

The findings point to how contradiction emerges in network. Although contradiction is not only problem in network management, the main focus remains on it. Furthermore, cultural and political factors are not investigated directly. Because political and cultural factors in network management is scarce and in most of previous studies there were little evidence for the existence of unity/diversity contradiction in network. The findings show, moreover, that the development of education program changed constituents and organizations’ opinion about program implementation. Organizations participated either directly or dispatched their managers to the education program. When participant organizations start to design program, they did not trust that each actor solely dedicated to the desired goal. In some instances, actors were criticized each other in network meeting and smaller organizations accused bigger ones not to meet schedule of decision-making. Network coordinating unit worked out human resource selection and attached personnel with appropriate knowledge.

Thirds, one of the most significant findings is how openness of the decision-making process and organizational autonomy increase interaction among members. Under open decision-making process, each member of the network accepts the final decision because it has been negotiated and agreed between sides. In both networks, each participating organization remains autonomous, and it is important for each organization to keep its identity. Without an open decision-making process and organizational autonomy, it would be hard to keep all of members together.

This research also finds that in the context of education program, unity/diversity contradiction was managed in networks by generating unity along network's metagoal, shared identity and shared experiences and by sustaining diversity among organizational size, culture, clients served.

Finally, research findings suggest that unity/diversity contradiction is important to improve network's capacity. Unity with diversity improves capacity of network because this structure creates an opportunity to network members to exchange information, generate trust, to get access to financial resource and learn others' expertise.

Response to social problems such as lack of skillful human resource depends highly on information. When government initiate to tackle social problems, organizations deal with information that is multidimensional, multi-sector. Management of unity/diversity contradiction allows the network to benefit from both of them. Contradiction is crucial to exchange information in network as diverse members bring their diverse subject-related information and put them in common.

In network, for a coordinated and effective action, organizations require accessing information about problem in order to respond it properly. In order to timely respond to the problem, information exchange among organizations needs to be encouraged and supported by coordinating unit. For increased performance to occur, information exchange needs to be flow continually among members within network. Therefore, member organizations must encourage to information exchange within network not only for their success but also network existence. Continuous flow of new information among members is lead to improve performance since timely flowing information help organizations in decision making. Management of unity/diversity contradiction supports effective information exchange in network. Building unity among diverse members encourage them to join a decision, which made based on diverse information.

In addition to information exchange, effective management of unity/diversity contradiction also gives an opportunity to organizations to access financial resources. Participating in a network benefits members by providing opportunities to access financial resources.

Prevailing wisdom holds that effectively managing network group can increase effectiveness by reducing costs without requiring formal structural changes. With control over resources, members have much influence in setting the ground rules and there is more check and balance in network than a single organization. A big concern of funders is that how funding organization spend money, because there are many wrongdoing scandal cases about spending of funded financial resources in organizational history. However, network system is more immune to such scandals due to its effective control system.

Since single organization does not have opportunity to attract enough financial resources to their projects, this shifts their interests to participate in network and unite with other members. For members of network then, the basic premise is that participation in network activities will increase access to resources and by uniting with other network members, costs can be reduces. Therefore, if network members do foster principled engagement to network and increase the capacity for joint action, it could be expect that it will increase access to resources.

Seeking and establishing unity among diverse members of network has been embraced by organizations for both proactive reasons such as information exchange and access to financial resources. Taking advantage of expertise also include among key opportunity given as a result of effective management of unity/diversity contradiction in network. During program implementation, each member of a network concentrate on their own area of expertise

and this helps to create whole network level expertise. In other words, diverse organizational expertise in a given field support to form a network level expertise in a given field.

Solution to nationwide problems requires different approaches and participation of organizations from a number of professional disciplines. It is also important to recognize that while educationists may have well-developed skills within their own area of expertise, it should not be assumed that they have all of the skills needed to implement program effectively. Therefore, all network members need the opportunity to learn the appropriate problem solution skills that will enable them to function as part of a network and therefore the network to function effectively as a unit.

If contradiction managed effectively in network, it leads to improve capacity of networks in three ways. First, it involves organizations to exchange information and continuous flow of new information among members is lead to improve performance and build a network's capacity to make decisions timely. Second, management of unity/diversity contradiction strengthen network capacity by giving individual organizations access to resources. Finally, contradiction management help organizations increase expertise, which enables them to be more efficient by combining their knowledge and ultimately form a network level expertise in special field.

7. Conclusion

The findings in this research have practical implications for institutions. Network management need constantly analyze because environment which they work are changing and organizational differences cause problems to interact. It is important for network leaders to realize that member organizations are diverse in terms of organizational size, culture, values and etc. and in each stage of program implementation NAO should be able to unite diverse members.

Before to start program implementation NAO is recommended to comprehensively analyze potential network members and realize differences among them. Unity and diversity produce similarly powerful yet contradictory requests with the possibility to undermine network objectives. Contradiction emerges in that neither pole can be favored over the other in the long-term and both must be amplified. Unity without diversity would produce inefficiency, because diversity is the reason unity exist in network. Building unity distinguishes organization-level and network level goals that jointly create an exchange system that determines the attainment of both. At the beginning, network member organizations may not have a common goal, but NAO need to unite member organizations around common goal that keeps network together over the longer term. NAO is advised to create common identity, which helps members to relate to each other's contexts and understand the underlying mechanisms and assumptions of network. Similarly, when members have share experience they may share exchange knowledge relate to the context and they are learning by doing so.

Moreover, this research identifies four leadership activities –activating, facilitation, framing and mobilizing- to manage contradiction in network. In networks that targeted to tackle social problems, member organizations are brought together by NAO – in our case this is coordinating unit. One of the significant implication of this study is that if NAO conduct leadership activities in a proper way network will be able to improve its capacity. NAO managers are recommended that activation of participants with an array of specialist expertise and diverse resources is needed to generate the necessary capacity to address target problems. In the activation process, one of the important factors is the relevance of members' working scope to the program, and this is an important criterion for selection of members. During network formation, NAO manager needs skills of persuasion and strategic problem-solving to activate collaboration among participants. An important factor for persuasion of members is trust, which is closely related to the successful management of unity/diversity contradiction in the network and enhances the coordinating unit's capacity to activate key members.

There are many internal problems and disputes in networks that can be solved by effective mediating skills on the part of NAO managers. Keeping communication flowing effectively is a vital function of facilitation, opening channels to solve confrontation in timely fashion. Network leaders may have good skills of integration, negotiation, or dispute resolution, but without sufficient information about values, organizational culture and geographical differences, it is almost impossible to reach targeted goals in the network. Similarly, style of language, open decision making, balanced dialogue and confrontation, and benchmarking are practices that recommended to NAO managers to use in order to strategically manage unity/diversity contradiction.

Every member of a network is autonomous, and for that reason, it is not easy to win the commitment of each member to the network. To achieve high commitment to the network's goal among members, NAO managers should ensure common norms and values in the network. By creating rules, norms, and culture of the network, NAO managers can generate a network-specific identity, shared identity, and enhance diversity within the network.

In order to manage unity/diversity contradiction effectively, managers must not only concentrate on potential members but must try to mobilize small communities and external members as well. By mobilizing all members, managers can use the broad knowledge of all participants to increase the network's external legitimacy.

If contradiction managed effectively in network, it improves capacity of networks in three ways. First, it involves organizations to exchange information and continuous flow of new information among members is lead to improve performance. Second, management of unity/diversity contradiction strengthen network capacity by giving individual organizations access to resources. Finally, contradiction management help organizations increase expertise, which enables them to be more efficient by combining their knowledge and ultimately form a network level expertise in special field.

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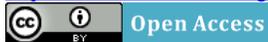
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SECURITY POSITION AND DETECTION OF UNUSUAL BUSINESS OPERATIONS FROM SCIENCE AND RESEARCH PERSPECTIVE

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Abstract. Security aspects and detection of unusual business operations (UBO) is a continuation of the ever-increasing need to assure priorities in research and development, particularly in ICT, for all key scientific research institutions in the critical services sector in the European Economic Area. This creates a complex ecosystem of continuous research and innovation. Maintaining this continuity is critical for introducing innovations to meet the legal and security frameworks in the context of the ever-expanding financial market and economic growth that the European Union countries are committed to by important documents such as Directive 2005/60 / EC of the European Parliament and Council from 26 October 2005, Commission Directive 2006/70 / EC from 1 August 2006, national laws on protection against the legalization of proceeds of crime (in the Slovak Republic, this is Act 297/2008 Coll. of 2 July 2008 on protection against the legalization of proceeds of crime and protection against terrorist financing, including amendments supplements to certain laws), and protection against terrorist financing, as well as laws on the implementation of international sanctions. These legal frameworks represent high costs for the entire sector (e.g. obligated persons), especially in the implementation of automated procedures in the evaluation of unusual business operations amounting to more than EUR 3 billion only in the Slovak environment. In accordance with the above-mentioned legal regulation, the obligated person (duty to report UBOs) becomes anyone who carries out a non-standard financial operation.

Keywords: security, unusual business operations, crime, money laundering, corruption, legal acts

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JEL Classifications: E26, E42, G21

1. Introduction

The topic of security and detection of unusual business operations is extremely topical not only from the point of view of the Slovak Republic, but also from that of the European Union as well as from the global point of view. In accordance with Act No. 297/2008 Coll. of 2 July 2008 on the Protection against the Legalization of Proceeds of Crime and Financing of Terrorism including amendments to certain acts, an unusual business operation is defined to encompass legal acts or other acts implying that their execution may result in legalizing the proceeds of crime or financing the terrorism.

2. Legalization of Proceeds of Crime ("Money Laundering")

Money laundering is a dangerous international criminal activity that includes not only the activities of the underworld, but also the politicians or governments of some states (Jančíková, E., Pásztorová, J. 2018). Legalization of proceeds of crime ("money laundering") is a global problem with serious economic and social consequences. Financial institutions spend a significant amount of their resources on automated transaction tracking information systems (Mura et al., 2017; Durkalić, D. 2016; Lorincová, 2018) while their experience suggests that institutions are increasingly dissatisfied with their current automated tracking efforts, i.e. they are looking for software that can reduce the burden imposed on regulatory sections (compliance). Some of these systems are implemented quickly, in a so-called "out of the box" manner in order to satisfy regulators, and later they are calibrated to detect significant suspicious activities.

Information technology in combination with advanced computing, particularly in form of data mining for the purpose of identification of money laundering and sophisticated detection of non-standard financial flows becomes important in combating money laundering as a specific part of legalization of proceeds of crime. From the point of view of institutions investigating the fight against money laundering, the financial and state institutions were predominantly active in the past (Gródek-Szostak; Nesterak, 2017). Following the tightening of legislation and intensification of the fight against money laundering and terrorism in recent years, universities are gradually joining this initiative.

The development of a new generation of systems which will have to meet future regulatory requirements as well as financial sector standards requires an interdisciplinary access and higher sophistication of information technologies. Slovakia is lagging behind in research and development on the issue of money laundering. Academic research and development are virtually absent in this area.

Corruption and money laundering are internally interconnected. Corruption offenses, such as theft of public funds, are generally linked to the purpose of own enrichment and acquisition of profits. Money laundering is a process of concealing illegal profits generated by crime. Successful legalization of revenue originating from the crime of corruption can minimize the fear of illegal profit confiscation.

The topic of money laundering is also a UN agenda, namely one of its components - United Nations Office on Drugs and Crime (UNODC). The OECD's activities in the area of tax criminal activity and money laundering complement the measures taken by FATF. These activities are carried out in a variety of ways, such as typological exercises, preparation and dissemination of practical instructions for detecting money laundering for central tax offices, tax advisers and auditors, exploration of key risk areas and coordination of OECD countries practices for sharing information against money laundering. One of the important materials be found in OECD recommendations to facilitate cooperation between legal and tax authorities promoting co-ordination of the fight against serious criminal activity.

The Financial Action Task Force (FATF) sets standards for the development and support of national and international anti-money laundering and terrorist financing policies. Recommendations published by FATF are designed to effectively combat money laundering and terrorist financing while countering corruption. These measures are focused particularly on:

- Preserving the integrity of public sector,
- Protecting designated institutions in private sector from abuse,
- Increasing the transparency of financial system,
- Facilitating the detection, investigation and prosecution of corruption and money laundering and recovery of stolen assets.

The introduction of a coordinated procedure that is in line with anti-money laundering legalization standards creates an environment in which corruption is promoted in a much more difficult way, particularly an environment that does not ensure impunity.

At present, we can see a change in crime scene as well as in the composition of crime. In addition to classical forms of crime, new forms of crime committed by organized criminal groups are appearing at the forefront. Criminal activity is committed in a planned manner with a focus on long-term high profit, while measures against its detection are being implemented. New forms of crime focused on long-standing high profitability and application of often sophisticated anti-detection measures are increasingly common on an international scale.

In the hands of organized groups, which are increasingly frequently committing criminal activity on an international scale, huge sums of unlawfully gained income are received. The vast amount of profit thus obtained brings about the necessary need to transform it into a legal financial system and invest it in profitable economic unions or otherwise capitalize it.

In most cases, the commercial and financial transactions that introduce "dirty money" into the legal financial system are not very noticeable and almost do not differ from normal operations. Today, a wide range of products and services make it easier to introduce resources into the system. The use of ICT in international banking and financial and payment systems facilitates activities, but brings about a directly proportional increase in the risk of global money laundering and financing of terrorism. Cybersecurity issues in rather frequently is perceived as synonymous of security of critical infrastructure (e.g. Dobrovič et al. 2017; Veselovská et al. 2017; Korauš, Kelemen 2018; Šišulák 2017; Limba, Šidlauskas 2018).

3. Results of Science and Research

In order to effectively combat the introduction of criminal proceeds into the legal financial system, it is necessary to develop scientific methods that serve as the basis for creating software for systematic detection of unusual business operations. Quantitative systematic risk assessment methods are preferred such as RM/RA CRAMM (Mullerova 2016, Mamojka, Mullerova 2016, Palková 2018) to be combined with crime forecast maps (Mullerova, Mamojka 2017). Systematic detection of UBO is dependent upon the development and introduction of new software based on scientific methods.

Contributions from money laundering can be divided into two parts. They are scientific and professional. The latter describes the implementation of recommendations for handling unusual business operations. Money laundering is a relatively new area in terms of research (quarter of century). For this reason, there is room for discovering new trends based on experience in jurisdiction as well as detection methods. Primary areas of possible algorithm application are as follows:

Financial Operations

To divert attention from too large sums, deposits are divided into small parts (so-called smurfing). Revenues from illicit trafficking are legalized through repeated deposits into accounts of various insiders in different countries and subsequent transfers to the destination country for the purpose of financing seemingly legal activities such as construction companies or pharmacies through the money-laundering process. The criminal organization will create a real labyrinth of mother and daughter companies with mutual ownerships and partnerships with headquarters in different countries, also subject to different tax regimes, the purpose of which is often not to achieve real profits, (if so, only indirectly), but to launder money generated by criminal activity.

System of Insurance

Many jurisdictions give the insured person the right to withdraw from insurance contract. This law is applicable within a certain period of time after the conclusion of contract, in principle without penalty and obligation to give reason for the withdrawal (as for the European Union, see Article 6 of Directive 2002/65 / EC). It is possible to conclude an insurance contract by single payment of premium by means of bank transfer, even from abroad, and then within a certain time limit to withdraw from the contract and claim back the amount paid. Since this amount formally comes from insurance, its illicit origin is easily hidden. Prior to this, the dirty money is invested in purchasing vehicles or other property, which is subsequently insured against theft or damage.

Real Estate Market

In case of money laundering, the real estate is purchased for a sum lower than its real value. The difference is paid in cash and this property is sold immediately, thus creating a fictitious capital gain that legalizes the income.

Accounting - Auditing

Issuing invoices for fictitious services or services below the declared value allows the company to justify and thereby legalize the amounts it has in its bank accounts. For the purpose of money pre-laundering, bank deposits are executed through fictitious companies or business activities (so-called front companies) directly or indirectly related to a criminal organization. The fictitious companies have cash availability due to their activities (restaurants, cinemas, supermarkets, gambling, etc.). In this way, legal proceeds and proceeds of crime are mixed and the recognition of injected amounts becomes almost impossible.

Stock Exchanges

Stellage is a market-based agreement whereby the buyer, after paying the insurance premium, reserves the right to decide whether to sell (so-called put options) or buy (so-called call options) a certain amount of bills and notes for a predetermined price and at a predetermined time. The stellage contract is then redeemed. Even if the person (Žul'ová et al., 2018) who is laundering the dirty money has to conclude the transaction with a mild loss at the maturity date, the amount received as a counter value for transferring the stellage is still formally covered by the option market operator and thus the connection with the crime is lost by means of investment. Swaps are yet another type of instrument. Swap is a derivative financial instrument that consists of regular cash flow exchanges between two counterparties. This agreement may be based on an exchange of interest rates or currencies. Swap transactions of repetitive and circular nature (in case of exchange between A and B, followed by exchange between B and C and finally between C and A) with a final zero balance can easily conceal the illegal origin of capital.

The degree of scientific contributions to money laundering and therefore unusual business operations varies. The best ones are published in journals indexed in the Web of Science database. There are not many of them. The reason for this is that many remain not published either because the algorithms and procedures are patented, or for tactical reasons on the grounds that the disclosure of the detection of unusual business operations to the public is undesirable. Rather, these contributions deal with the development in science-based areas as such, namely with the possibility of their application in the field of detection of legalization of criminal proceeds.

With regards to the content, the posts can also be divided into two types. The first part consists of contributions where the methodology of money laundering research includes in most cases a combination of literature and secondary data. There are very few cases of empirical research into the phenomenon of money laundering or control thereof. Contributions use theory as a basis for research and as a support tool for analyzing and creating conclusions. Studies have an analytical, often descriptive character. The second part consists of contributions where the methodology consists of a description of mathematical and statistical methods and algorithms to be used in the creation of tools for the identification of unusual money laundering operations. Studies are of analytical, exact nature.

A valuable resource for assessing the state of peak research into unusual business operations, money laundering can be found in an article by Mei and Gao (2014). Based on information from the Web of Science database which includes both scientific articles on the legalization of crime revenue and anti-terrorist financing, Mei and Gao (2014). Analyzed the years 1993 - 2013. Altogether, 891 contributions from the analyzed area were published and included in the Web of Science database. There are around 200 contributions dealing with years 2014 - 2015. It can therefore be stated that the scientific community's interest in this issue is rising, perhaps also due to the alarming increase in money laundering and terrorist financing.

Mei and Gao report (2014) presents the state of development and focus of international money laundering research, based on an analysis of the distribution of authors, distribution organizations, quoted journals, and keywords.

The analysis of Mei and Gao (2014) shows that there are three main ways of investigating money laundering. These areas are as follows:

- Research on the prediction of money laundering offenses;
- Research into legislation against the legalization of criminal proceeds;
- Research into the risk of money laundering in Germany.

The country leading in the number of articles on legalization of criminal proceeds (in the WoS database) is USA with nearly one hundred contributions. It is followed by China, England, Germany and Australia. Romania is ranked sixth. The ten most productive countries in money laundering research are included in the following table.

Table 1 The most productive countries in money laundering research (1993-2013)

Country	Number of Contributions	Country	Number of Contributions
US	97	Romania	17
China	42	Canada	14
England	39	Netherlands	13
Germany	21	Italy	10
Australia	19	Ukraine	10

Source: Mei a Gao (2014)

Among the authors, Hetzer maintains the key position in the world's AML research and plays the most important role (Hetzer 1999a, Hetzer 1999b, Hetzer 2001a, Hetzer 2001b, Hetzer 2003). Also, other authors such as Dongming Xu Shijia Gao, Ping Song, Pengzhou Zhang, Agus Sudjianto, Pieth M., (1994), Thomas Naylor, JC Sharman, and Jun Tang have a far-reaching impact on the development of scientific knowledge in the fight against money laundering. Co-authorship usually exists in teams of D.D. Lin and R. Xue; Bin Feng, Ping Song & Yang Qifeng; Shijia Gao and Dongming Xu; Agus Sudjianto, Caroline Ziemkiewicz and Alvin Lee; and Oana Andreea Pirnuta, Alina Adriana Arzén, Cosmina Oana Draghici and Gabriel Florin Moisescu. However, there is a lack of interdisciplinarity between cooperation bodies, which may be a limiting factor in further development of

international money laundering research. Countries around the globe have regulated their own regime of anti money laundering laws to curb and prevent this crime (Ahmad 2017, Blanaru 2013, Hernandez 2009).

Table 2 contains the twelve most productive research institutions involved in combating the legalization of criminal proceeds. We can see them as centers of excellence in scientific research associated with combating money laundering and identifying unusual business operations.

Table 2 Centers of Excellence Research Associated with AML

Institution	Description	Number of articles Web of Science
Wuhan University of Technology http://english.whut.edu.cn/	Public research university in Wuhan, capital of Hubei province, China.	7
Cardiff University www.cardiff.ac.uk/	One of the top 5 UK universities with an excellent research base.	5
Queensland University of Technology https://www.qut.edu.au/	Public research university in Australia	5
University of London www.london.ac.uk/		5
Florida International University www.fiu.edu/	Public research university in US	4
University College Dublin www.ucd.ie/	Leading research university	4
McGill University https://www.mcgill.ca/	Canadian public research university based in Montreal, Quebec	4
Griffith University https://www.griffith.edu.au/	Public research university	4
Bank of America https://www.bankofamerica.com/	Bank of America is the largest US commercial bank in terms of deposits and the largest company of its kind in the world. Bank of America is the largest US company which is not part of the Dow Jones Industrial Average.	3
Carnegie Mellon University www.cmu.edu/	Research university known by interdisciplinary programs	3
The University of Virginia www.virginia.edu/	Flagship research university	3
Southwest Jiaotong University english.swjtu.edu.cn/	National Key University in Chengdu, Sichuan, affiliated with the Ministry of Education of China	2

Source: own processing according to Mei and Gao (2014)

"Journal of Money Laundering Control" is the only periodical in the world specialized in the field of money laundering research. Other major but not monothematic magazines on money laundering include "Crime, Law and Social Change", part of "Lecture Notes in Computer Science", "American Criminal Law Review" and "International Organization". "The Journal of Financial Crime" and "Communications of the ACM", "Pacific Law Journal", "Foreign Affairs", and the "British Journal of Criminology" have a great impact on money laundering research. Interesting magazine is "Journal of Security and Sustainability Issues" - a peer-reviewed journal which publishes original research papers which focused for example in: Conceptual Approaches towards Security, Security Technologies, Technological Development for Security, Computer and Information Security and others.

Table 3 Summary of the most frequent keywords in articles associated with AML

Frequency	Key word	Frequency	Key word
66	Money laundering	6	Fraud detection
22	Terrorism	6	Terrorism financing
19	Anti – money laundering	5	Security
11	Crime	5	Electronic cash
11	Data mining	5	Enforcement
9	Politics	4	Compliance
9	Corruption	4	Risk
8	Globalization	4	Intelligence
6	Shadow economy	4	Networks
6	State	3	Classification

Source: Mei a Gao (2014)

The following overview contains the six most quoted works from the AML area. Based on the number of citations, we can see that this is not an area with a high number of citations (hundreds of quotes as in the case of key publications in the field of economic or medical science). This is mainly due to the need to continuously innovate AML detection procedures.

Truman, E.M. (2014): Chasing Dirty Money: The Fight Against Money Laundering (27 citations)

Strafer, G.R. (1989): Money Laundering: The Crime of the 90s (23 citations)

Irvine, M.R. (1987) Money Laundering Control Act Of 1986: Tainted Money and The Criminal Defence Lawyer (20 citations)

Harmon, J.R. And James, D. (1988): United States Money Laundering Laws: International Implications (18 citations)

Stessens, G. (2000): Money Laundering: A New International Law Enforcement Model (14 citations)

Razzano, F.C. (1994) American Money Laundering Statutes: The Case for A Worldwide System of Banking Compliance Programs (14 citations)

Conclusions

In order to combat the introduction of criminal proceeds in the legal financial system effectively, it is necessary to improve security and strengthen scientific research capacities in university environment as well as to develop scientific methods that serve the basis for creating software which will allow systematic security and detection of unusual business operations.

Regarding the up-to-date and global manner of unusual business operations, money laundering and protection against legalization of proceeds from crime and protection against terrorist financing, legal and legislative frameworks need to be updated.

Following the legislative frameworks mentioned in the introductory section, an amendment to Act 297/2008 of codex from 2 July 2008 is being prepared on protection against the legalization of proceeds of crime, and prevention of financing of terrorism including amendments to certain laws.

The main purpose of the proposed amendment is the transposition of Directive 2015/849 of the European Parliament and Council of 20 May 2015 on the prevention of the use of the financial system for the purpose of money laundering or terrorist financing, which amends the Regulation 648/2012 of the European Parliament and Council and repeals the Directive 2005/60 / EC of the European Parliament and Council as well as the Commission Directive 2006/70 / EC (hereinafter referred to as "IV AML Directive").

The purpose of transposition of IV. AML Directive is particularly to amend the basic requirements of the so-called customer due diligence, or enhanced customer due diligence, namely, the conditions of customer care (basic, simplified and increased).

Uniformity of AML laws among different countries may deter criminals from laundering money. The ratification of the Vienna Convention can help to facilitate uniformity of legal rules. States need robust domestic laws to tackle money laundering. Money laundering is an international crime, although not always a specific crime in international law. Moreover, it is generally advantageous to consider money laundering to be a specific crime under international law (Keesoony 2016).

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STUDY ON THE SPATIAL DISTRIBUTION OF CHINA'S OUTWARD FOREIGN DIRECT INVESTMENT IN EU AND ITS INFLUENCING FACTORS*

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Abstract. Since 2000s China's outward foreign direct investment (OFDI) in developed economies has grown rapidly, boosting the technological advancement of Chinese companies and the advancement of global value chains. In the context of the United States continuing to impose investment restrictions on China, the EU has an important position in the OFDI pattern in China. Although China's OFDI in the EU has maintained rapid growth overall, the location distribution is not balanced. This paper uses spatial measurement method to test China's spatial pattern change of OFDI in EU member states and finds that there are spatial agglomeration effects and spatial spillover effects. The spatial panel analysis method is used to test the factors affecting the spatial distribution China's OFDI in EU. It is found that the market size, technology level and investment freedom of the host country have positive effects on the location selection of China's OFDI in EU.

Keywords: outward foreign direct investment (OFDI); spatial distribution; influencing factors

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1. Introduction

In recent years, unilateralism and counter-globalization have grown stronger, causing a greater impact on global economic growth, trade and investment. In this context, global foreign direct investment (FDI) fell by 23% in 2017 to \$1.43 trillion. According to the "2017 China Foreign Direct Investment Statistics Bulletin" issued by the Ministry of Commerce, China's outward foreign direct investment (OFDI) in 2017 was US\$158.3 billion, down 19% year-on-year. There are two reasons for this. On the one hand, investment protectionism in some countries is prevalent, and Chinese multinationals have encountered more obstacles in foreign investment, especially cross-border mergers and acquisitions. For example, due to the US government security review, China's direct investment in the United States fell by 62% in 2017, only \$6.4 billion. On the other hand, the Chinese government has taken the initiative to strengthen the control over capital outflows and issued a series of policies such as the "Notice on Further Guiding and Regulating the Direction of Overseas Investment Directions", so that irrational foreign investment has been contained.

However, in stark contrast to the shrinking global direct investment, 2017 China's OFDI to Europe reached US\$18.5 billion, a year-on-year increase of 73%, a record high, which was nearly three times that of China's OFDI to US. In terms of investment flows, Europe has surpassed Asia (except HongKong) for the second consecutive year in 2016-2017 to become the largest destination for China's OFDI. Europe has become the preferred destination for China's OFDI. On the one hand, the main reason is the attractiveness of Europe's developed economy and advanced technology, and on the other hand it is also inseparable from the open economic environment in Europe. However, from the perspective of China's spatial distribution of OFDI in Europe, there is a big difference in investment flows and stocks in different countries. The spatial agglomeration feature of China's OFDI in Europe is definitely not a random distribution but implies a profound economic mechanism. Based on the study of China's evolution of the spatial and temporal distribution of OFDI in the EU, this paper uses spatial economic statistics to analyze its factors.

In the following sections, after reviewing the literature on basic issues, a detailed analysis of China's growth in OFDI in Europe and changes in spatial distribution over time will be conducted. Subsequently, we used spatial measurement methods to test whether there is a significant spatial correlation between China's OFDI in Europe. Finally, using the panel data of China's OFDI in various countries from 2007 to 2016, an empirical analysis model is established to deeply study the factors affecting the distribution of China's OFDI in Europe.

2. Literature review

In this part, we will briefly review the development of FDI theory, focus on the motives and behaviors of developing countries' direct investment in developed countries, and analyze the different motives and location choices of developing countries such as China to invest in developed countries and regions.

FDI are a global phenomenon whose share in international business is steadily rising and generates large capital injections. FDI has been and continues to be an important factor in the development of transition countries. They help create new jobs, which can lead to an influx of new technologies, and in total they provide the necessary capital to restore a successful transition to the market economy (Fabus, M., Csabay, M., 2015, 2018, Tancosova, 2013, 2014). Dudas, deals with the significance of workforce (Dudas, T; Dudasova, M., 2016).

The core of OFDI theory is to explain the motivation of OFDI and the conditions for its realization (Wen, X., Liyun, L. 2015). The FDI theory that emerged in the 1960s believed that the motivation of the enterprise OFDI was that the developed countries had the advantages of ownership, location and internalization, and realized global benefits through FDI. But these theories mainly explain the phenomenon that FDI flows from developed

countries to developing countries. With the development of practice and the deepening of research, many scholars have explored the motivations and methods of FDI from the perspective of developing countries, and have produced many FDI theoretical results. These theories include Theory of Small Scale Technology (Wells, 1977), State on Localized Technological Capacities (Lall, 1983), Investment development cycle theory (Dunning, 1988), Technical innovation and industry upgrading theory (Buckley, P.J.; Casson, M.A., 1981) etc. In the theory of FDI motivation of multinational corporations, Dunning creatively divides FDI into resource motive, efficiency seeking, market seeking and strategic asset seeking four motives (Dunning, 1993), which becomes the basic paradigm for studying OFDI motivation and behavior.

The distribution of OFDI flows in different countries (regions) can reflect the motivation of host countries' transnational investment as a whole (Buckley, 2007). According to the flow of OFDI, investment in developing countries can be defined as "gradual gradient" OFDI, and investment in developed countries is defined as "inverse gradient" OFDI (Kolstad, I., Wiig, A. 2012). The motivation for "gradual gradient" OFDI is mainly resource seeking and efficiency seeking, while the purpose of "anti-gradient" OFDI is mainly market seeking, technology seeking and acquiring strategic assets such as technology and brand (Xianming, W. Chuntao, H. 2016). When an emerging economy is in the catch-up phase, it often has Binary feature: both the forward gradient OFDI flowing to developing countries and the inverse gradient OFDI flowing to developed countries (Yamakawa, 2010). Taking the OFDI distribution in Japan in the 1980s as an example, the OFDI flowing to developed regions such as North America and Europe is mainly based on market seeking, technology seeking, information acquisition and avoidance of trade friction, while OFDI mainly flows to developing countries and regions. Motivation is the pursuit of low production costs (Lee, 2015). At present, the motivation and location choice of China's OFDI also has duality. In developed countries, the main purpose of OFDI is market seeking and technology seeking (Brada, J. C., Drabek, Z., & Perez, M. F., 2012). In developing countries, OFDI is mainly aimed at resource seeking and political relations (Buckley, 2007). More specifically, China's OFDI flows can also be divided into three types of countries or regions: countries or regions with abundant natural resources, developing countries with cheap labor and advanced countries, and technologically advanced developed countries (Dudas, 2016).

In recent years, under the "Belt and Road Initiative" initiative, the OFDI flowing to developing countries in China and the OFDI flowing to developed countries in Europe and America are growing rapidly. The issue of location selection of OFDI in China has aroused widespread concern in the academic circles. The research on the location distribution of China's OFDI basically follows the same lines as foreign scholars. The research perspective is mainly based on market size (Guanhong, J., Dianchun, J., 2012), geographic distance (Lu, 2014), resource endowment (Guanhong, J., Dianchun, J., 2012) and strategic asset motives (Cheung, 2011, Tvaronavičienė 2018).

From the perspective of market seeking motivation, the market size is undoubtedly an important factor affecting the choice of OFDI location. The larger the size of the host country market, the greater the potential for FDI to achieve economies of scale in local investment operations, and therefore proportional to the inflow of FDI (Bevan, Estrin & Meyer, 2004). A lot of research on China's OFDI also confirmed that market seeking is an important consideration for Chinese companies' cross-border investment (Jia, Y., Zhang C., 2012). The geographical distance is related to the cost of transportation and the communication efficiency between the parent company and the subsidiary company (Stopford, J. M., 2008). Therefore, FDI is more inclined to start in close proximity countries. With the development of China's economy, the demand for natural resources such as oil and ore are increasing. Therefore, acquiring the resources of the host country has become an important purpose and means of OFDI in China (Song W., Xu, H., 2012). In addition, many scholars have tried to interpret the location choice of China's OFDI from the perspective of the host country system, and further enrich the connotation of China's OFDI location selection theory (Deng Ming, 2012; Jia Yucheng, 2017).

From the perspective of investment flows, China's OFDI to Europe belongs to the "inverse gradient" OFDI. Europe's developed economic level, perfect institutional environment and huge integrated market are important reasons for attracting China's direct investment in Europe (Chovanova Supekova, S., Szwajca, D., 2018). In particular, the EU has developed into the region with the highest degree of economic integration in the world. Despite this, the natural conditions, technical level and economic freedom of the 28-member states of the European Union are still very different. (Blanc-Brude, F., Cookson, G., Piesse, J., & Strange, R., 2014) Chinese enterprises based on different investment motives must have certain preferences in the distribution of OFDI in Europe. This is one of the focuses of this paper. This paper intends to conduct a detailed investigation of the spatial distribution of OFDI in Europe, and then through empirical tests, analyze the main factors affecting the distribution of OFDI in Europe and propose corresponding countermeasures.

3. Growth of China's OFDI in EU

From China's reform and opening up to the WTO accession in 2001, China and the EU's bilateral investment is mainly based on EU's FDI in China. China has only a small amount of FDI in Europe, and the EU's FDI flows and stocks in China far exceed China's The amount of China's investment in the EU. After China's accession to the WTO in 2001, China's OFDI began to show a significant growth trend, but due to the relatively low base, China's OFDI to the EU is still far lower than the EU's OFDI to China. However, since 2008, under the in-depth promotion of the "going out" strategy, China's OFDI has begun to explode and has become the fastest growing country in the world. In particular, the financial crisis of 2007-2009 and the European debt crisis provided a rare opportunity for China to acquire developed-country enterprises. The growth rate of China's OFDI in developed countries is particularly obvious. In this context, China's OFDI traffic to the EU has grown rapidly. In 2010, China's OFDI traffic to the EU exceeded the EU's OFDI traffic to China for the first time (Figure 1).

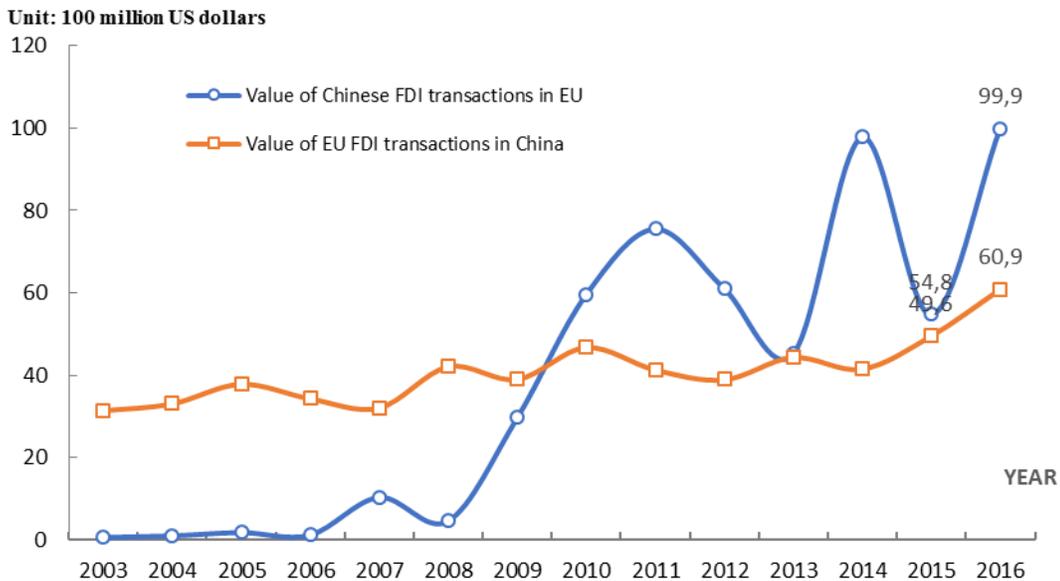


Fig.1. Value of FDI flows between China and EU

Source: China's foreign direct investment Yearbook (2003-2016)

In the decade of 2007-2016, China's OFDI traffic to the EU increased by 8.5 times. By the end of 2016, China's stock of OFDI to the EU reached US\$68.94 billion, accounting for 36.5% of China's OFDI stock in developed

economies, surpassing China’s OFDI stock in the US (US\$60.56 billion, 31.7%), in China’s OFDI in developed economies. Ranked first (Table 2). Under the Sino-US trade dispute and the increasingly severe restrictions on US investment in China, it is a general trend for China's OFDI to accelerate its transition from North America to Europe.

Table 1. China's OFDI flows to major developed economies in 2016

Name of country, economy	Values of OFDI stock (100 million US dollars)	Proportion
EU	698.4	36.5%
US	605.8	31.7%
Australia	333.5	17.4%
Canada	127.3	6.6%
Israel	42.3	2.2%
Japan	31.8	1.7%
Norway	26.4	1.4%
Bermuda	21.7	1.1%
New Zealand	21.0	1.1%
Switzerland	5.8	0.3%
amount to	1914.0	100%

Source: China's foreign direct investment Yearbook (2003-2016)

4. Changes in the spatial distribution of China's OFDI in the EU

In this part, we analyze the imbalance of China's OFDI distribution in the EU and its trend with time from the two aspects of flow and stock.

First of all, we pay attention to the time and space changes of China's OFDI stocks in the EU countries. Through ArcGIS10.1 software, this paper obtains the distribution map of OFDI flows from China to EU countries at four different times in 2004, 2008, 2012 and 2016 (as shown in Figure 2). From the perspective of overall flow changes, China's OFDI flows to the EU show an accelerating growth trend, with almost all countries showing significant growth. China's investment coverage in the EU has also expanded, from about 60% in 2004 to nearly 90% in 2016.

From the perspective of China's distribution of EU's OFDI flows, it presents a pattern of “western high base” (Figure 2). In 2004, China’s OFDI flow to the EU was only US\$73 million, and the flow of more than US\$10 million was only in the United Kingdom (\$294.4 billion), Germany (\$275 billion), and France (\$103.1 billion). At that time, China’s “going out” strategy was in its infancy, and its ability to internationalize was low. In 2008, China's OFDI traffic to the EU increased to 470 million US dollars, and the number of countries with investment flows exceeding 10 million US dollars reached 10, of which direct investment in Germany reached 180 million

US dollars, ranking first among EU member states. Although it is nearly six times more than in 2004, due to the low base, China's OFDI traffic to the EU is still far below the EU's FDI flows to China (\$4.21 billion in 2008). In 2012, China's OFDI traffic to the EU soared to US\$7.04 billion, far exceeding the EU's FDI of US\$3.9 billion.

However, from the perspective of regional distribution, the United Kingdom, Germany, and France are still the main destinations for China's OFDI. China's investment flows to Central and Eastern Europe are still relatively small, and the imbalance in regional distribution is further aggravated.

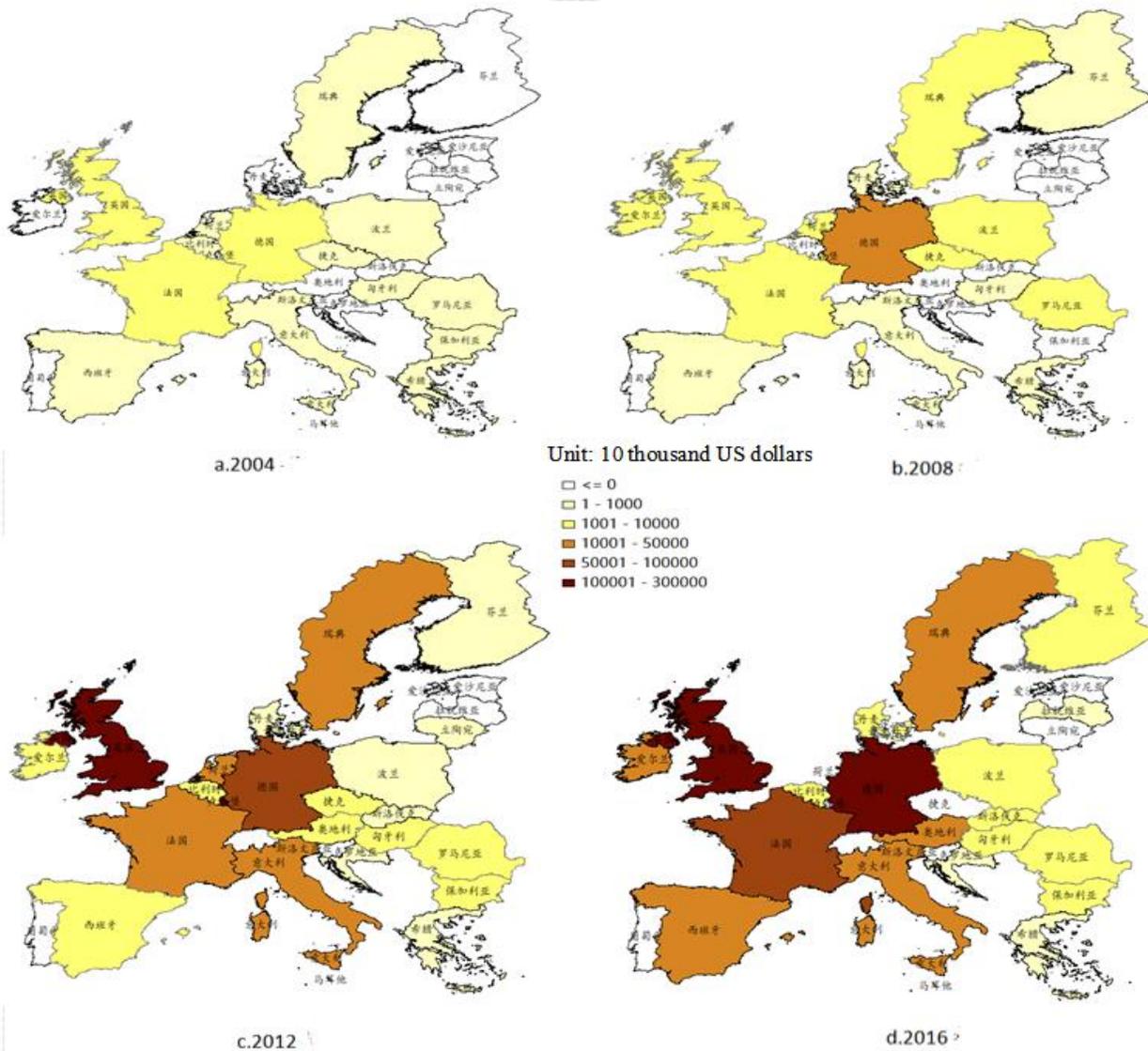


Fig.2. Time and space characteristics of China's EU's OFDI traffic

Source: China's foreign direct investment Yearbook (2003-2016, organized by ArcGIS10.1 software)

Then we analyze the distribution of China's OFDI in EU countries from stock data. Judging from China's stock of OFDI in the EU, the concentration of investment in Europe is relatively high. As shown in Figure 3, before 2014, Luxembourg was once the country with the largest stock of OFDI in the EU, followed by the United Kingdom, France, Germany and the Netherlands. Luxembourg is a European tax haven with a geographical advantage in Europe, a flexible legal and regulatory environment, and extensive bilateral tax treaties that attract investment from around the world, including Chinese companies. However, most of China's investment in Luxembourg is financial and commercial trade investment, and it is less invested in manufacturing. As China's direct investment in Europe is increasingly flowing to high-end manufacturing, Luxembourg's position in China's direct investment in Europe tends to decline. China's stock of OFDI in Luxembourg fell from a record high of \$15.7 billion in 2014 to 2016. 8.8 billion US dollars, ranking fourth in Europe. In addition, the Netherlands is more special. Before 2014, China's OFDI to the Netherlands has been lower than that of the UK, France, Germany and other countries. Due to the occurrence of the company's acquisition of the Philips Lighting business in the Netherlands and the RF Power Division of NXP Semiconductors in 2015. Business, China's OFDI stock in the Netherlands surged from US\$4.2 billion in 2014 to US\$20.6 billion in 2015. The Netherlands jumped to the country with the largest OFDI stock in Europe. By the end of 2016, the countries with the most stocks of investment in Europe were the Netherlands, the United Kingdom, Luxembourg, Germany and France.

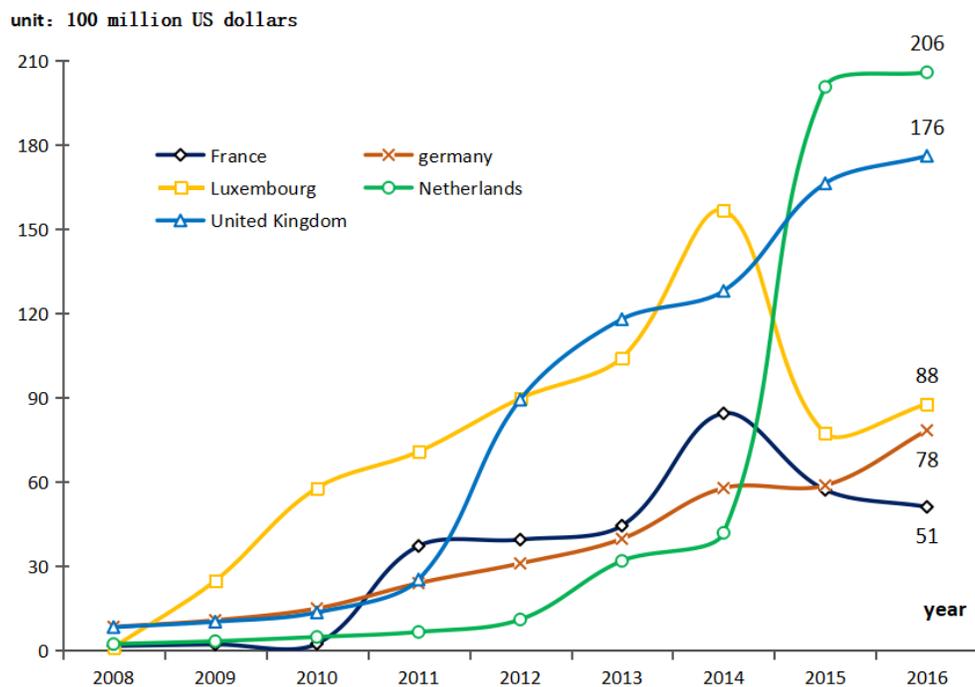


Fig.3 Top 5 states of China's OFDI stock in EU

Source: China's foreign direct investment Yearbook (2003-2016)

From the perspective of the European subregion, China's OFDI to Europe is mainly concentrated in Western Europe, accounting for 51.2% of China's OFDI traffic to Europe in 2016. Followed by nine countries in Central and Eastern Europe, accounting for 27.6% in 2016, but Germany accounted for 23.2%, other countries only accounted for only 4.4%. It can be seen that although China has vigorously developed economic and trade cooperation with Central and Eastern Europe under the "One Belt, One Road" initiative, the OFDI for Central and Eastern Europe is still relatively small. China's OFDI stocks in the three Nordic countries are not high in the EU, and mainly concentrated in Sweden. China's stock of OFDI in Finland and Denmark is very small. China's EUDI

is less distributed in 10 countries in southern Europe, mainly concentrated in economically developed countries such as Italy and Spain (Figure 4).

We can easily find that although China's OFDI in EU has grown rapidly in recent years, the spatial distribution is extremely uneven, showing the heterogeneity of geospatial space and the space of contiguous accumulation. The pattern suggests that there may be spatial associations in neighboring countries. Under the background of the deepening of EU integration, the policy environment and factor endowments of member states tend to be the same, but why are there such big differences? It is of practical significance to clarify the main factors affecting the spatial distribution of OFDI in China.

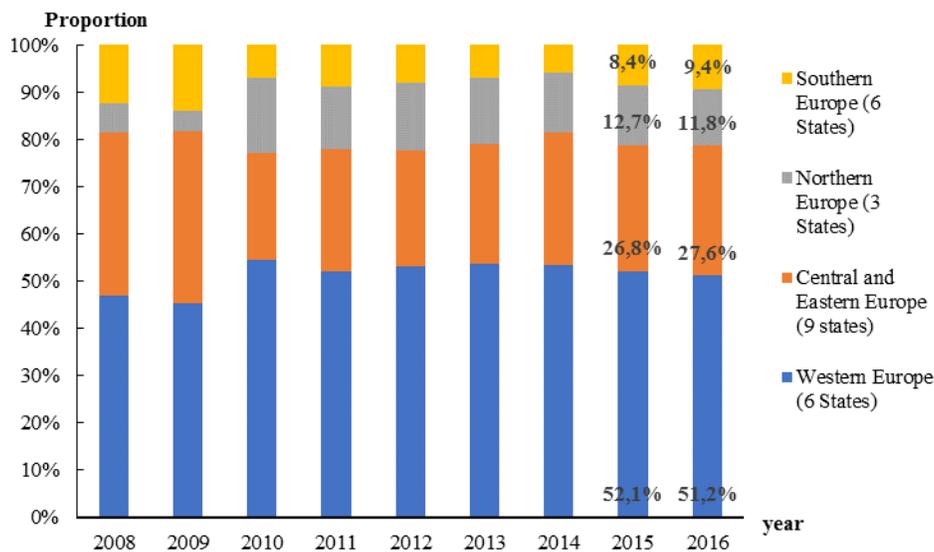


Fig.4. Proportions of China's OFDI stock in Different regions of the EU

Source: China's foreign direct investment Yearbook (2008-2016)

5. Methods, models and data sources

In the last chapter, we analyze the distribution of China's OFDI in the EU through ArcGIS software, and graph the overall time and space characteristics of China's OFDI in EU countries. In this chapter, we will further analyze the data and explore how to establish an econometric model to examine the factors affecting the distribution of China's OFDI in the EU.

Spatial autocorrelation test is one of the most important methods in Exploratory Spatial Data Analysis (ESDA) research, reflecting the degree of correlation between a certain geographical phenomenon or an attribute on a regional unit and the same phenomenon or attribute on a neighboring regional unit. Is a measure of the degree of aggregation in the spatial domain (Wang Qian, Jin Xiaobin, Zhou Yikang, 2011), the commonly used spatial autocorrelation indicator is the Moran's I. This paper uses Moran's I to test whether there is a global spatial correlation between China's EU and OFDI stocks. The formula for this index is as below:

$$\text{Moran's } I = \frac{n \sum_{i=1}^n \sum_{j=1}^n \omega_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^n \sum_{j=1}^n \omega_{ij} \sum_{i=1}^n (x_i - \bar{x})^2} = \frac{\sum_{i=1}^n \sum_{j \neq i}^n \omega_{ij} (x_i - \bar{x})(x_j - \bar{x})}{s^2 \sum_{i=1}^n \sum_{j=1}^n \omega_{ij}} \quad (1)$$

In the formula (1), n is the number of individuals in the study area; x_i and x_j are the values of the monitored variables of the region i and the region j, respectively.

$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$ is the average of the monitored variables in each region; $s^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$ is the variance of the monitored variable i and ω_{ij} is the spatial weight matrix.

According to the meaning of the Moran's I index, the calculation results are distributed between -1 and 1. An index greater than 0 indicates that the monitored variables exhibit a positive correlation. The closer to 1 indicates that the regions with similar properties are clustered together; the smaller than 0 indicates that the monitored variables between the regions exhibit a negative correlation, and the closer to -1 indicates that they are different. The areas of the attribute are significantly clustered together. If the Moran's I index is close to 0, it means that the monitored variables are in a randomly distributed state. According to the results of the spatial correlation test, it is decided to adopt a spatial econometric model or a non-spatial econometric model to measure various factors affecting the spatial distribution of China's OFDI in the EU. With the stock data of China' OFDI in EU countries from 2007 to 2016, we obtains the results of Moran's I index over the years through ARCGIS10.1 software and listed in Table 1. The data shows that the Moran's I index for in 2007-2016 has the following characteristics: In 2007-2012, the Moran's I index was close to zero, but the P value was > 0.05, and did not pass the significance test. It shows that during this period, the distribution of China's OFDI in EU did not show a significant agglomeration. However, the data from 2013 to 2016 show that Moran's I is greater than zero, and gradually increased, and the P value is <0.05. After passing the remarkableness, China's OFDI stock in the EU has begun to show a significant agglomeration state. Not randomly distributed. And since 2012, Moran's I index has been increasing.

Table 2 Values of Moran's I index (2007-2016)

Year	Moran's I	Values of Z	Values of P
2007	-0.020328	0.203725	0.838568
2008	0.026327	0.708342	0.474833
2009	0.052806	1.116248	0.264316
2010	-0.016816	0.309115	0.757234
2011	0.119725	1.795893	0.072511
2012	0.08219	1.27632	0.201935
2013	0.136899	1.855273	0.063557
2014	0.182298	2.287816	0.022148
2015	0.231121	2.874808	0.004043
2016	0.238919	2.917965	0.003523

Source: The data in this table is calculated by ARCGIS10.1 software.

Since the Moran's I index for most years did not pass the significance test, the paper uses the panel data from 2007-2016 to establish a non-spatial measurement model to examine the factors affecting China's EUDI location selection.

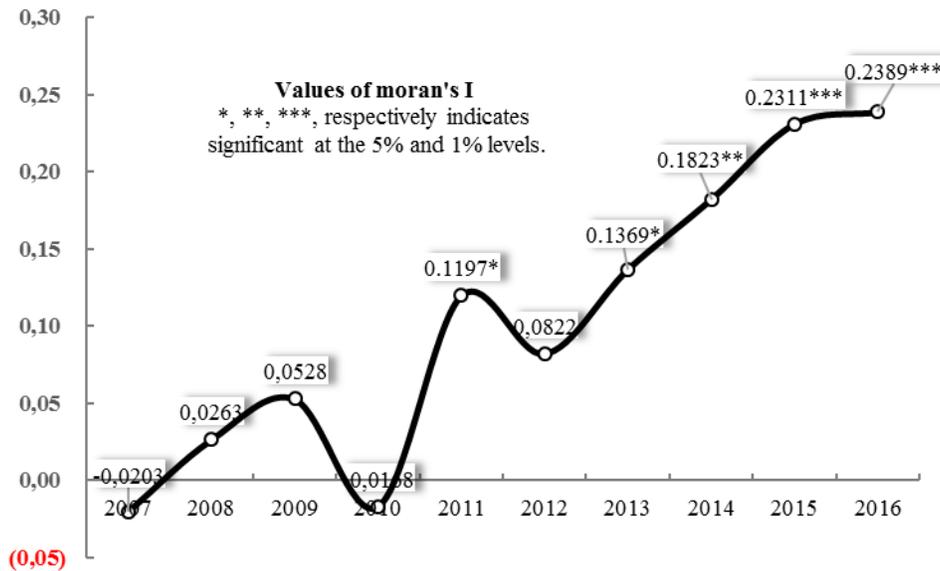


Fig.5. Changes of Moran's I index

Source: The data in this table is calculated by ARCGIS10.1 software.

Then we consider the choice of variables and the setting of the measurement model. The explanatory variables studied in this paper are China's OFDI to the EU. The statistics are divided into annual flow data and historical inventory data at the end of the year. This paper takes China's OFDI stock in EU countries as the explanatory variable. The reason for choosing the stock data, on the one hand, is that it is not only the incremental OFDI in the current year, but also the stock OFDI in the past years. It also considers the instability of China's traffic data to the EU, especially in recent years. Large-scale cross-border mergers and acquisitions will cause large fluctuations in OFDI traffic, affecting the measurement effect, while the stock data is relatively stable.

For the choice of explanatory variables, according to the FDI theory, there are many factors that influence the location selection of FDI. Drawing on Buckley's investment generalization model, the host country's influencing factors are divided into two categories: one is the investment motivation factor, and the other is the enterprise internalization advantage factor. The influencing factors of investment motivation mainly include market size, natural resources, strategic assets and labor resources; internalization factors mainly include cultural distance, geographical distance, openness to foreign investment, and trade links. In this paper, according to the actual situation of EU, choose the following variables:

Host country GDP. From the perspective of market seeking motivation, the market size is undoubtedly an important factor affecting the choice of OFDI location (Reiner, G., Demeter, K., Poiger, M., & Jenei, I., 2008). The larger the size of the host country market, the greater the potential for FDI to achieve economies of scale in local investment operations, and therefore proportional to the inflow of FDI. A large number of studies on China's OFDI have also confirmed that market seeking is an important consideration for Chinese companies' OFDI. This paper uses GDP as an indicator to measure the size of a country's market.

Patent application volume PAT. According to the OFDI theory of developing countries, the EU as a developed economy, Chinese enterprises must also have strong technical seeking motives for EU OFDI. Therefore, this paper incorporates the total number of patent applications in the host country as indicators of the technical level.

Export scale EXP. Numerous studies have shown that there is a strong correlation between FDI and foreign trade. On the one hand, a country's OFDI will open up the host country market, reduce trade barriers, and drive the country's exports to the host country. On the other hand, maintaining long-term economic and trade exchanges with the host country will help to grasp the market trends of the host country and provide decision-making information to the country for its OFDI. Therefore, this paper incorporates China's export scale to EU countries into the measurement model.

Investment freedom FRD. The economic system, especially the management system for foreign capital, can reflect the difficulty of operating activities in the host country. The higher the quality of the host country system, the more attractive it is to FDI in China. This paper selects the sub-index of the national economic freedom index provided by the American Heritage Foundation over the years - the investment free score to measure the quality of the host country's foreign investment system.

Other variables, such as geographical distance, take into account the EU's most overall, China's geographical distance to the EU countries does not have large differences, it is also difficult to quantify its indicators, so this article does not incorporate geographic distance into the model. The same natural resources are not the main motives of OFDI in EU countries, so they are not included in the measurement model. Finally, this paper establishes the following measurement model:

$$\ln OFDI_{it} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 \ln PAT_{it} + \beta_3 \ln EXP_{it} + \beta_4 \ln FRD_{it} + \varepsilon_{it} \quad (2)$$

The subscript *i* indicates the *i*-th host country. This paper selects 28 EU member states for metrological analysis; *t* indicates the year, this paper selects 10 years of data from 2007 to 2016; α is the intercept term, ε_{it} is the random disturbance term, and the variable The description is shown in Table 2.

China's OFDI stock data for the 28-member states of the European Union comes from the wind database and the China Foreign Direct Investment Bulletin. The GDP data of EU member states comes from the Eurostat. Considering the fluctuations in the exchange rate between the euro and the US dollar in recent years, the euro calculation can more accurately reflect the GDP growth of each country. China's export data to EU member states is derived from the China Statistical Yearbook. The investment freedom index of EU member states is derived from the annual report issued by The Wall Street Journal and the American Heritage Foundation. The technical level indicators of EU member states adopt the number of patent applications from various countries, and the data comes from the "National Five IP Office Statistical Reports (IP5SR)".

Table 3. Value of FDI flows between China and EU

Variable nature	Variable name	Indicator selection	Economic significance	expected
Explained variable	OFDI	Stock of OFDI		
Explanatory variables	GDP	National GDP	market size of Host country	Positive correlation
	PAT	patent applications of Host country	technology level, strategic assets of Host country	Positive correlation
	EXP	China's exports to the host country	Close ties between China and the host country	Positive correlation
	FRD	Investment freedom	Degree of facilitation of host country investment	Positive correlation

Source: own processing.

6. Data Treatment and the Empirical Results

With the panel data of China's OFDI in 28 EU member states in 2007-2016, we conduct regression analysis.

In order to prevent the occurrence of pseudo-regression, before the panel regression model is analyzed, the stability test of each variable data listed in Table 2 is performed. Then determine whether there is a long-term cointegration relationship. If it exists, a cointegration analysis is performed. This panel data uses LLC, ADF-fisher and PP-fisher methods comprehensively to judge whether the variable data is stable. The results of unit root test are shown in Table 4.

The test results show that except for the variable LNPAT which is a horizontal stationary variable, the others are horizontal non-stationary variables. However, all variables are stationary variables after the first-order difference. This judge whether there is a long-term relationship between variables. Therefore, it can be considered that the sequence is stable after the difference, that is, all variables are non-stationary first-order single-integration process, and we can do long-term cointegration analysis to determine whether there is a long-term relationship between variables.

Table 4. Results of Unit Root Test (ADF)

Variable	Difference	Test Type (C, T, L)	LLC	Breitung	ADF-Fisher	PP-Fisher	Conclusion
LNOFDI	0	(C,T,1)	-8.11261 (0.0000) **	2.53786 (0.9944)	55.8351 (0.3328)	57.1421 (0.2900)	unstable
	1	(C,0,1)	-11.8083 (0.000)**	—	122.133 (0.0000) **	141.840 (0.0000) **	stable
LNGDP	0	(C,T,1)	-37.6174 (0.000)**	0.92213 (0.8218)	217.978 (0.0000) **	87.1051 (0.0016) **	unstable
	1	(C,0,1)	-42.6768 (0.000)**	—	254.259 (0.0000) **	206.936 (0.0000) **	stable
LNPAT	0	(C,0,1)	-6.49732 (0.000)**	—	83.2498 (0.0038) **	88.6163 (0.0012) **	stable
	1	(C,0,1)	-14.8437 (0.000)**	—	159.243 (0.0000) **	203.690 (0.0012) **	stable
LNFRD	0	(C,T,1)	-7.75317 (0.000)**	-0.38270 (0.3510)	60.1894 (0.0781)	82.9823 (0.0007) **	unstable
	1	(C,T,1)	-24.4429 (0.000)**	-2.78789 (0.0027)	138.998 (0.000)**	168.976 (0.000)**	stable
LNEXP	0	(C,T,1)	-16.8697 (0.000)**	-1.50294 (0.0664)	90.8843 (0.00071)	101.951 (0.0000) **	unstable
	1	(C,T,1)	-123.489 (0.000)**	-5.78981 (0.000)**	153.320 (0.000)**	212.617 (0.0007) **	stable

Source: The data in this table is calculated by eviews6.0 software. Test types C, T, and L respectively indicate that the unit root test equation includes a constant term, a time trend term, and a lag order, with 0 indicating no time trend term or lag order. The data in parentheses is the P value of the variable; - indicates no existence; *, **, respectively indicates significant at the 5% and 1% levels.

Cointegration tests were performed on the model using Kao Residual Cointegration. The test results t statistic was -3.100932 and Prob. was 0.001. Therefore, there is a cointegration relationship between the variables of the equation. Then, using the F test and determining whether to use the invariant coefficient model or the variable intercept model based on the F test results. The fixed effect model and the random effect model were selected according to the Hausmann test results. Based on the above tests of the model, we finally establish a fixed effect variable intercept model, the model is as follows:

$$LnOFDI_{it} = - 52.45 + 3.33LnGDP_{it} + 0.79LnPAT_{it} + 0.35LnEXP_{it} + 2.89LnFRD_{it} + \varepsilon_{it} \quad (3)$$

(-6.8070**) (5.3107**) (4.3658**) (1.7279*) (4.667423**)

The values in the brackets are t, and ** and * indicate significant at the level of significance of 1% and 10%, respectively. R2=0.869064, F-statistic=52.87994, Prob (F-statistic)=0.000.

According to the t value in formula (3), China's stock Value of OFDI in EU has a co-integration relationship with host country GDP, patent application amount PAT, investment freedom FRD and foreign trade export volume EXP. At the high level, the significance test is passed, and there is a long-term correlation equation; the goodness of fit of the coefficient equation is as high as 0.857, and the equation is statistically significant.

The cointegration equation shows that there is a long-term equilibrium relationship between the distribution of OFDI in EU countries and the host country's economic scale (GDP), technology level (PAT), investment freedom (FRD) and export scale (EXP). But the four factors have different effects on the increase of OFDI. Overall, the host country's economic scale (GDP) plays the most important role in China's OFDI. The correlation coefficient between the two countries is the highest, the marginal output elasticity reaches 3.33, that is, the host country's GDP growth is 1%, and China's OFDI growth for the country is 3.33%. Secondly, the correlation coefficient between the host country's investment freedom (FRD) and China's OFD reaches 2.896, and the host country's investment freedom increases by 1%. China's OFDI growth for the country is 2.896%. The third is the technical level (PAT) of the host country. For every 1% increase in the number of patent applications on behalf of the technical level, China's OFDI for the country is up 0.79%. Finally, for every 1% increase in China's export volume (EXP) to the host country, China's OFDI for the country increased by 0.35%.

Conclusions

As the world's second largest economy, China's rising position in global cross-border investment in recent years has caused widespread concern. This paper makes a comparative analysis of the growth and location distribution characteristics of China's OFDI in the EU and explains the imbalance of China's OFDI distribution in different regions of the EU. China's investment in the EU has obvious regional differences between "Western High East" and "Northern Strong South"; China's OFDI concentration on the EU is very high, and the UK, Germany and France are very stable top three, the Netherlands is super M&A has leapt to the top in recent years, and Luxembourg has a place in the special status of tax havens. However, with the increase of China's cross-border mergers and acquisitions in the EU, Luxembourg's intermediary role is rapidly declining. From the perspective of development trends, as China's economic transformation and upgrading and the strength of multinational companies improve, China's OFDI will continue to flow into Europe and play an important role in the European economy.

The location of China's OFDI in Europe reflects China's motivation for EU OFDI. Market size and investment freedom are the two most important factors. This shows that Chinese companies invest in Europe, the most important purpose is market development. The EU has a population of 510 million, and its per capita income of 32,000 US dollars is four times that of China. It is a huge integrated market favored by Chinese companies. At the same time, compared with the United States, the EU is relatively open to foreign investment, especially to China, which is also an important reason for attracting Chinese companies to invest in Europe. In the context of the Sino-US trade war and the strategic containment of the United States against China, the free and open market in Europe is becoming more and more important in China's foreign investment.

As a developing country, China's OFDI in developed countries such as EU, also has an important goal of obtaining strategic assets, especially technology assets. The empirical research in this paper finds that Chinese companies prefer to countries with advanced technology. In recent years, Chinese companies have favored small and medium-sized enterprises with mature technology in Europe and are willing to conduct cross-border mergers and acquisitions at a higher price. This may sound uncomfortable, but from a resource allocation perspective, it is a win-win situation rather than a hostile act. Chinese capital, combined with European technology, has revitalized technological assets and promoted technological advances in China through reverse technology spillovers.

The research on China's OFDI is an area of great theoretical and practical value. This paper focuses on the time and space changes of China's OFDI in the EU, and empirically tests its influencing factors. In addition, a more in-depth study of China's OFDI in the EU's operating methods, cultural integration and business performance will be more challenging and valuable.

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MOTIVATION FOR DISCLOSURE OF CORPORATE SOCIAL RESPONSIBILITY: EVIDENCE FROM BANKING INDUSTRY IN INDONESIA

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Abstract. This research aims to investigate determining factors that influence corporate social responsibility disclosure (CSR disclosure) by examining the effects of company size, profitability, leverage, public ownership, board of commissioner, independent commissioner, and the size of the audit committee. For this study, the samples are banking firms that are listed in Indonesian Stock Exchange between the year 2010-2014. The data were extracted from audited financial reports, and sustainability reports (if available). Quantitative using secondary data. Multiple regression is the analysis performed. Results from this study showed that profitability, public ownership, board of commissioner, and independent commissioner has a positive impact towards corporate social responsibility disclosure, whilst leverage and audit committee negatively affected the company. Furthermore, there was not enough evidence to prove that the size of the company is affecting companies to disclose their corporate social responsibility activities.

Keywords: corporate social responsibility disclosure; company characteristic; corporate governance; banking firms

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JEL Classifications: G21, G32, M14

1. Introduction

Corporate social responsibility has become major concern among academicians and managers (Moslemany & Etab, 2017); (Yevdokimova, Zamlynskyi, Kuznietsov, Sakovska & Anatolii, 2018) and very much relevant to the businesses. Issues such as global warming, social rift in the society, and also the environmental damage had triggered business to perform social responsibility activities (Rokhmawati, Gunardi, & Rossi, 2017); (Asmeri, Alvionita, & Gunardi, 2017); (Khoiruman & Haryanto, 2017). Social responsibility is a form of commitment from the company to take a part in sustainable development (Rokhmawati & Gunardi, 2017); (Jones, Wynn, Hillier, & Comfort, 2017).

CSR has received great attention among the world business communities in the last decade, and Indonesia is no exception. Albeit CSR phenomenon is still debatable in Indonesia. One of the evidence is shown in a research conducted by (Supriyono, Almasyhari, Suhardjanto, & Rahmawati, 2015) which found an indication that managements in Malaysia and Thailand were more aware of Corporate Social Disclosure (CSD) as compared to Indonesian businesses operators. CSD practices in these countries CSD were still considerably low due to CSD practices were not considered as important and were more on wasting company's funds.

Studies on CSR were more focused on the non-financial sector and there was is still little CSR research focusing on the banking sector (Khan, 2010). Particularly in this case banking as part of the fast-growing financial industry coupled with issues of CSR disclosure practice has become increasingly prominent in social accounting and corporate governance.

Banking sector is one of the most aggressive industry in promoting CSR activities, despite there is no direct negative impact from its operations to the society (Semenescu & Curmei, 2015); (Aktan, Turen, Tvaronaviciene, Celik & Alsadeh, 2018). Bank is a profit oriented organization, but to gain their profit they use the resources trusted to them by the third party, which also mean that their activities are based on the public trust. Hence, the bank need to hold some responsibilities to the public (Krasodomska, 2015). Bank's social responsibility, as a part of the social system, is defined by public's expectations. Therefore, to fulfil the expectations, banks need to include the environmental and social impact as an integral part of their operational activities (Barako & Brown, 2008).

In Greece, for example, this kind of information are being disclosed through environmental accounting (Choudhury, Salim, Bashir, & Saha, 2013); (Nikolaou, 2007), stated that banks have to go green and to be proactive in preserving and protecting the environment. This is to assist the banks to operate better and also to change the nature of how customer deals with the business. The proper use of environmentally friendly technologies and also the good management system are not only bringing good impact for the environment, but also for the sake of operating the business efficiently.

This research aims to investigate the determining factors in Indonesian banks that influence corporate social responsibility disclosure (CSR disclosure) by examining the effects of company size, profitability, leverage, public ownership, board of commissioner, independent commissioner, and the size of the audit committee. This research is expected to contribute to the theory development by confirming the view that the implementation of CSR is one important factor for the future of the company. Moreover, to provide a proactive encouragement in the oversight function of corporate behaviors, and also to raise public awareness of their rights on the existence of the business. On the practical side, this research is expected to give an outlook for the managers in the process of adding values to the company though CSR. Finally, this research is expected to be used as a reference in research related to the effect of firm size, profitability, leverage, public ownership, board of commissioners, independent commissioners, and the size of the audit committee on CSR disclosure to banking firms.

2. Determining Factors for CSR

Many researchers have done empirical studies with regards of banks' practices on CSD (Barako & Brown, 2008); (Branco & Rodrigues, 2006); (Choudhury et al., 2013); (Hamid, 2004); (Hossain & Reaz, 2007); (Khan, Halabi, & Samy, 2009); (Khan, 2010); (Krasodomska, 2015); (Menassa, 2010); (Nikolaou, 2007); (Semenescu & Curmei, 2015); (Wu & Shen, 2013), (Kunitsyna et al., 2018). These studies revealed variations of factors affecting banks CSD practices, which are company size, profitability, leverage, pubic ownership, commissary board, independent commissary, and the size of audit committee.

2.1. Company Size

Previous research on the disclosure of social responsibility has used firm size to explain variations in corporate social responsibility disclosure. Company size has been hypothesized and found by several studies to have a positive relationship with the level of social disclosure (Giannarakis, 2015); (Gunardi, Febrian, & Herwany, 2016); (Semenescu & Curmei, 2015).

2.2. Profitability

Variations on social responsibility disclosure in previous studies suggested that it can be explained by profitability. It is recorded that some theorists mentioned profitability as a factor that allows, or may encourage, management to undertake and disclose a broader program of social responsibility to shareholders (Giannarakis, 2014); (Giannarakis, 2015); (Gunardi et al., 2016); (Semenescu & Curmei, 2015).

2.3. Leverage

Leverage is used as a variation on the disclosure of social responsibility in previous researches argued that a low leverage ratio confirmed that creditors will not put much pressure on limiting the flexibility of management of CSR activities (Andrikopoulos & Krikilani, 2013); (Giannarakis, 2015); (Uwuigbe & Egbide, 2012).

2.4. Public Ownership

Previous studies have also shown that proprietary dispersion in many investors contributes to increased pressure for CSR disclosure (Khan, Muttakin, & Siddiqui, 2013); (Gunardi et al., 2016). The significant number of stakeholders in the dispersed company means that the benefits of disclosure tend to outweigh the costs associated with public companies. It is also become very important for a company to be seen as publicly accountable.

2.5. Board of Commissioner

Another variation of social responsibility disclosure is by forming a board of commissioners dedicated to addressing CSR issues to show serious concerns about non-financial performance and have a higher tendency to report on their CSR policies and practices (Esa & Ghazali, 2012); (Giannarakis, 2014); (Haji, 2013); (Naseem, Riaz, Rehman, Ikram, & Malik, 2017); (Rao, Tilt, & Lester, 2012).

2.6. Independent Commissioners

Independent commissioners significantly characterize the corporate governance to build relationships with corporate social responsibility disclosures found that independent commissioners contributed positively to increasing CSR reporting rates (Naseem et al., 2017); (Cuadrado-Ballesteros, Rodríguez-Ariza, & García-Sánchez, 2015); (Khan et al., 2013).

2.7. Audit Committee

The final variation on the disclosure of social responsibility in previous studies can be explained by the audit committee (Akbas, 2016); (Khan et al., 2013); (Said, Zainuddin, & Haron, 2009). On the previous research has proven that audit committee has a positive and significant correlation with the level of CSR disclosure.

3. Methods

The population in this research is all companies in banking sector listed in Indonesia Stock Exchange between 2010-2014. Choosing the banking sector as a framework for our research is not done arbitrarily. Since financial activities are not expected to result in damage to the environment, the bank's decision to undertake CSR projects can be considered to be entirely voluntary. It is interesting to investigate under which conditions managers prefer to invest in CSR projects in order to understand the way they consider CSR to be beneficial for banking institutions.

The range of study periods will be expanded over five years of observation, starting from 2010-2014 for the reasons of obtaining a sufficient number of samples and observations statistically. Longer periods of study will provide greater possibilities for obtaining results that are closer to the actual conditions. The sample is taken by using purposive sampling method (Rahmawati, Rispantyo, & Djamaluddin, 2017). The total sample was selected as many as 15 companies. In this study, the sample are specialized on banking companies listed on the BEI. Specialization of the sample can avoid results biased due to different characteristics of companies listed on the BEI. The data are being extracted from audited financial reports, and sustainability reports (if available) obtained from the official website of Indonesia Stock Exchange. The following operational definitions of the research variables are presented in Table 1.

The multiple regression model used to test the hypotheses of this research are:

$$CSR = \beta_0 + \beta_1SIZE + \beta_2PROFIT + \beta_3LEV + \beta_4PO + \beta_5BOC + \beta_6IC + \beta_7AC + \varepsilon$$

Table 1. Defining the Variables

Variables	Code	Measure
Company size	SIZE	Total asset natural logarithm
Profitability	PROFIT	Company's profit after tax divided by total equity
Leverage	LEV	Company's total liability divided by total equity
Public ownership	PO	Total amount of public ownership
Board of commissioner	BOC	Number of board of commissioners in the company
Independent commissioners	IC	Percentage of independent commissioners out of total members of the board of commissioners.
Audit committee	AC	Number of audit committees in the company
CSR disclosure	CSR	GRI G3.1 social responsibility disclosure index consisting of 79 items and 6 aspects, namely environmental, human rights, labor practices and decent work, society, product responsibility, and economic by using content analysis method

4. Results and Discussion

Descriptive statistics (Table 2) show that the level of social responsibility disclosure done by the average of listed banking companies in BEI is still relatively low, amounting to 22.01% of the overall GRI component. This research uses CSR disclosure indicator from GRI G3.1.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CSR	75	8.86	44.30	22.0081	9.44681
SIZE	75	9.97	20.57	15.0615	3.19379
PROFIT	75	-3.38	43.83	16.3776	10.38710
LEV	75	3.03	15.62	8.0033	2.18187
PO	75	.04	50.84	24.3161	17.92170
BOC	75	3.00	9.00	5.8533	1.79107
IC	75	25.00	80.00	54.8620	10.05761
AC	75	2.00	9.00	4.4133	1.46207

Thus, the number of CSR disclosures obtained by this study cannot be compared with other studies that use different indicators. 79 items of CSR disclosure were according to GRI G3.1, the average banking company only revealed 22.01%.

The size of banking firms that was used as samples showed a value in the range of 15.06 indicated by a low standard deviation and the range between the minimum and maximum is not too far apart. The result of descriptive analysis shows that profitability variable has a minimum value of -3.38% and a maximum value of 43.83% with standard deviation of 10.39. The low leverage average value is 8.00x with the standard deviation of 2.18 and the maximum value of 15.62x.

Corporate governance aspects are proxied by public ownership, board of commissioners, independent commissioners, and audit committees. The average public ownership of the sample is 24.32% with the standard deviation of 17.92. The average number of boards of commissioners is in the range of 5 people although large companies have up to 9 members in their board of commissioners, with the average percentage number of Independent Commissioners of 54.86%. The average audit committee is 4 persons with the highest number of 9 people.

Table 3. Multiple Regression Analysis and Hypothesis Testing

Variable	Hypothesis	Coefficient	t	p-value
(Constant)		.165	2.424	.018
SIZE	+	-.001	-.342	.733
PROFIT	+	.004	3.959	.000*
LEV	-	-.012	-3.002	.004*
PO	+	.001	1.830	.072**
BOC	+	.011	1.677	.098**
IC	+	.235	2.639	.010*
AC	+	-.029	-4.037	.000*
F	10.548			
Sign. F	.000*			
R ²	.524			

Dependent variable: CSR disclosure (CSR D)

** significant at level 10%, * significant at level 5%

The coefficient of determination (Table 3) shows that the model used in this study is only able to explain the variability of social responsibility disclosure of 52.4%. The remaining percentage is explained by other variables outside the study. There is not enough evidence to prove that there is any significant impact of firm size on CSR disclosure, which is in line with research conducted by (Sunarsih & Nurhikmah, 2017), that stated other arguments rejected the hypothesis because there is a variety of CSR views; a view that CSR implementation is important and some other views that CSR implementation is not important. This perspective will ultimately affect CSR practices by companies and also the impact of CSR disclosures that are structured within the company. Company will consider the costs and benefits to be gained when deciding to disclose social information. If the benefits to be earned exceed the costs incurred, the company voluntarily discloses social information, hence the size of the asset does not affect CSR disclosure. These results indicated to not having a positive relationship, the bigger the company does not align with complexity of its operation and cannot show broader disclosure of Corporate Social Responsibility (Sari, Sutrisno, & Sukoharsono, 2013).

Profitability has a positive influence on the disclosure of social responsibility in line with (Giannarakis, 2014); (Giannarakis, 2015); (Gunardi et al., 2016). Profitable companies provide more CSR information about disclosure to legitimize their existence. A positive relationship between profitability and CSR disclosure possibly due to the freedom and flexibility possessed by the profitable company has to expose its CSR practices more broadly to stakeholders, thereby legitimizing its existence. The profitability of banking institutions reflects its capacity to generate resources that will be directed to CSR actions (Semenescu & Curmei, 2015).

Regarding leverage has a negative influence on CSR disclosures is consistent with (Giannarakis, 2014); (Giannarakis, 2015); (Uwuigbe & Egbide, 2012). Companies with higher leverage ratios may avoid implementing social reporting initiatives to avoid checking from creditors. Companies do not seem to want to pay additional fees for social disclosure (Uwuigbe & Egbide, 2012). When the corporate leverage is low the activities of social responsibility to be performed by the company will be high, otherwise if the value of leverage is higher then, the activities of corporate social responsibility will be lower. This happens because when the company has a low leverage then the company does not have a big responsibility to the creditors, hence it has the freedom to do anything within the company including doing activities of social responsibility, so that social activities will be higher.

The coefficient of public ownership shows that this explanatory variable has a positively significant correlation with CSR disclosure. Public ownership has a positive influence on disclosure of social responsibility in line with research by (Gunardi et al., 2016); (Khan et al., 2013). Transferring company ownership to the public brought the consequences of diminishing control of the shareholders themselves against the company. The greater the percentage of shares released, the greater the public's control over company policy, so the public needs to have more voluntary disclosure of information from the company to monitor its progress. It also shows that in general public ownership in Indonesia is concerned with social issues such as human rights, education, labor and the environment as critical issues that should be extensively disclosed in the sustainability report of the company. The positive influence on CSR disclosure occurs when the company has a board of commissioners in line with (Akbas, 2016); (Esa & Ghazali, 2012); (Haji, 2013); (Naseem et al., 2017); (Rao et al., 2012). Interventions given by the board of commissioners on the management side of the company's social performance have begun to be seen. Board of commissioners began to implement their supervisory function on social performance. This is because more productive discussions are held and hence more investments are made on those activities (Honggowati, Rahmawati, Aryani, & Probohudono, 2017).

Independent commissioners have a positive influence on the disclosure of social responsibility consistent with (A. Khan et al., 2013); (Naseem et al., 2017); (Rao et al., 2012), which indicates that independent commissioners encourage CSR disclosure. The existence of an independent commissioner within the board of commissioners may oversee the actions of the company's management and ensure that the board of directors can create policies consistent with the interests of stakeholders.

The independence of the board of commissioners may encourage management to disclose broader information to its stakeholders including social and environmental information. A high commitment in implementing CSR is demonstrated through CSR disclosure in the annual report. The level of independent directors in the board of directors can also act as a positive influence on the decisions of the board of directors on matters relating to corporate CSR programs.

Based on the results of the study, the audit committee was found to have a negative relationship associated with CSR disclosure. Management of companies with high audit committees tends to reduce the disclosure of social responsibility. These results are clearly contrary to the results of the study (Akbas, 2016); (A. Khan et al., 2013); (Said et al., 2009).

The forming of audit committee can also be caused only to meet government requirements without considering the competence of the audit committee. This is evident from the appointment of audit committee members in public companies that are largely not based on adequate competence and capability but are more based on proximity to the company's board of commissioners.

Conclusions

Research variables that can explain variations in social responsibility disclosure, such as profitability, public ownership, commissioners, and independent commissioners have a positive influence on disclosure of social responsibility, whilst leverage and audit committees have a negative effect. However, this study did not succeed in proving the effect of firm size on the disclosure of social responsibility.

In general, this research was able to support stakeholder theory which states that every stakeholder is able to influence the company. This is because profitability, leverage, public ownership, board of commissioners, and independent commissioners influence the disclosure of social responsibility. This research is also able to prove the theory of legitimacy. The stakeholders may begin to pay attention to the acquisition of legitimacy.

This paper has several major limitations. First, it is recommended to give an addition to the periods analyzed to provide more reliable results. Secondly, it is recommended to expand the sample to include companies from other equally developing countries in ASEAN to be able to compare the similarities and differences. Finally, social disclosure scores are based without taking into account the quality dimensions of disclosure developing interviews.

Furthermore, this study became incommensurable with other studies when each researcher used different indicators in assessing the extent of disclosure of social responsibility. Although the indicator issued by GRI is considered most appropriate for the purpose of this study, but did not rule out that other researchers have different indicators that are considered more appropriate. Different views of the use of appropriate indicators and the absence of certain rules on voluntary social responsibility disclosure has made it difficult to compare the results of similar researches.

Based on this research results, there are some suggestions that can be considered for further researches. This research suggested that future research includes the strength of state institutions (regulation) in CSR arrangements. For the government and the Institute of Accountants Indonesia is expected to formulate a policy to make corporate social responsibility as a mandatory disclosure given the low level of social responsibility disclosure. However, strict CSR regulation is only found in state-owned enterprises (BUMN) but not in companies in general. Furthermore, public awareness in developing countries on environmental conditions may affect corporate behavior in running and disclosing CSR. Building the proxy of institutional strengths in emphasizing CSR is a challenge for the future researches.

This study recommends for a follow-up study that attempts to compare the capabilities of each CSR disclosure framework. GRI updates its indicators on a regular basis as public perceptions and needs for corporate social responsibility are constantly changing and increasing. However, the use of GRI as an indicator of disclosure is not a corporate liability that ultimately opens the opportunity for researchers to develop diverse CSR disclosure indicators. As a consequence, the diversity of CSR disclosure indicators could influence the consistency of the research results.

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PREREQUISITES FOR THE DEVELOPMENT AND PROSPECTS OF ORGANIC AGRICULTURAL PRODUCTS MARKET

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Abstract. The study establishes the peculiarities and characteristics of how world organic agricultural market develops and functions. The factors of demand and supply of organic agricultural products are singled out. Specific factors influencing the price of organic products, which should take into account the differences in yield and productivity, the need for crop rotation, the risk of harvest loss and loss in storage, and the cost of R&D are also identified. In modern conditions, prices for organic products are higher than for traditionally produced agricultural products, but the demand for organic products increases, taking into account their impact on human health. The research provides the analysis of market indicators dynamics and levels of organic markets development in comparison with different countries. The influence of institutional systems development that guarantees the quality of organic products in different countries is identified. We discovered the conditions for the development of the organic products market and systematized them into the following groups: organizational and legal, financial and economic, technological and socio-psychological. We identified the prospective directions of the organic products market development, related to the financial mechanisms of investment improvements; strengthening the agricultural producers' rights protection; ensuring food security; improving the system of customers' information; and research conduction. We proved that a systematic approach to the production development on an investment-innovative basis, creation of an institutional environment, sustainable development of rural territories, development and implementation of strategies for the development of vertically integrated structures, taking into account territorial differentiation, is needed for the development of organic agricultural products market.

Keywords: organic products; organic agricultural products market; certification; agro-industrial sector; factors of demand and supply; organic market size

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1. Introduction

The organic food market is a global food market dynamic segment, which develops on an innovative basis and has a social and environmental focus. The global organic products market has grown from \$10 billion in 2010 to

\$70 billion in 2016. Expected further growth of this market is \$110 billion in 2020 (TechSci Research, 2015). Organic production is carried out in 179 countries. The growth of organic food production and sales is caused by the increase of the negative effects of the traditional agriculture intensification with the use of mineral fertilizers, pesticides, oil products, GMO components, and medicines for crop and livestock productivity increase. In contrast to these processes, organic agriculture contributes to environmental safety strengthening, natural resources restoration, biodiversity preservation, and to the energy safety enhance by the use of clean technologies, not only at the national level, but also in the global economy.

In the most of developed countries, the organic agricultural products market is already formed, and has clearly defined economic relations between producers, processors, sellers, controlling bodies, and consumers. Thus, the study and dissemination of this positive experience is relevant.

In economic literature much attention is paid to the study of organic farming and its role in the country growth. Research on the essence and conditions of organic production developments has been done by El-Hage Scialabba & C.Hattam (2002), T. Kovalenko (2014), V. Grigoryk & E. Klimov (2016), S. Ivanova & A. Latyshov (2018) and others. The features of the formation and development of the organic agricultural products market are disclosed in the works of L. Hamzaoui-Essoussi & M. Zahaf (2009), J. Michelsen, U. Hamm, E. Wynen, E. Roth (1999), E. Sokolova (2012), G. Thompson (2000), L. Zepeda & J. Li (2007).

Despite the scholars' considerable attention to the peculiarities of the organic agricultural products market development, in our opinion, the scientific substantiation of this market development factors in accordance with national features and foreign experience is insufficient.

The aim of the article is to substantiate scientific regulations and develop the conditions for the organic products market growth at the national level on this basis.

The object of this research is the process of organic agricultural products market formation and development. Methodological basis of this research is a dialectical method of cognition of socio-economic phenomena and processes. The author used general scientific and special methods of research: grouping and classification (to study the essence, functions, and conditions of the organic agricultural products market); analysis and synthesis (to determine the factors of demand and supply for the organic agricultural products market, and the character of their influence); economic-statistical (to determine the dynamics of the market indicators); scientific abstraction (to determine the direction of the organic agricultural products market development).

Author's conclusions and proposals are based on the use of factual data – statistical information, legislative and normative acts of the countries and international organizations studied. Assessments and conclusions can be used to model scenarios for the production and consumption of organic products' development both at the global level and the specific countries and regions.

2. Terms of development and structure of the organic agricultural market

Organic production provides the preservation of soils, ecosystems and human health, and is carried out without the harmful resources use (See: El-Hage Scialabba, C.Hattam (ed.), 2002). Organic food production processes include: in crop cultivation – the refusal to use mineral fertilizers, chemical pesticides and GMOs, in animal husbandry – the refusal to use antibiotics, growth stimulators and artificial immunomodulators, as well as the animal keeping methods that restrain their movement. Under such conditions, the cost of organic food production is usually higher than of the traditional one. To reduce the dependence of organic production on natural causes it is necessary to use scientifically grounded methods of agriculture. In crop cultivation this includes choosing the appropriate species and varieties which can resist pests and diseases; the use of crop rotation, mechanical,

physical and biological methods of protection; the use of microbiological, vegetable and animal origin minerals as biodegradable fertilizers which do not lead to degradation of soils. In animal husbandry, the animals are kept based on their physiological and behavioural needs, they are provided with living conditions which adequately take into account the main aspects of their natural behaviour; the animals should be fed with the organically produced feedstuffs and natural substances of non-agricultural origin; mainly natural methods of reproduction are used; the disinfection of premises should be done by authorized means only.

Organic agricultural products market is a combination of relationships between buyers and sellers based on selling and purchasing of organic agricultural products.

This market includes following segments:

1. The market for organic products (raw materials) of vegetable origin includes of crop production sale/purchase, the cultivation and use of plants as a forage base for organic livestock breeding.
2. The market for organic products (raw materials) of animal origin includes the sale/purchase of livestock breeding products and their use for organic food production.
3. The market for organic aquaculture products includes the sale/purchase of fish, crustaceans and shellfish.
4. The market for organic beekeeping products (raw materials) includes bees' breeding and receiving honey, wax and other bee products.
5. Wildlife market includes food and medicinal plants and mushrooms growing in ecologically clean areas and collected by man for consumption and sale (See: Kovalenko T., 2014).

The organic agricultural market is a niche market (only a certain proportion of consumers are ready to pay extra for the quality of products). Also, this market is cross-sectored, as it covers various segments of the food and non-food markets.

The organic food market development demands that the following prerequisites are presented, as shown in Table 1.

Table 1. Conditions for the organic products market development

Group of Influence Factors	Aspects	Implementation Instruments
Organizational and Legal	Development of the legal field for the production and sale of organic products.	Formation of the legal framework to regulate the properties, cultivation conditions, and sale of organic agricultural products.
	Planning and programming.	Creation of state strategies and programs for organic production development.
	Countries organic product's certification and marking system development.	International standards implementation and development of national standards for organic agricultural production.
	Innovations' stimulation and commercialization.	Stimulation of R&D aimed to create biological means of plant and animal protection; brining out new regionalized varieties of plants resistant to pests, diseases and bad weather conditions; organic fertilizers production; implementation of innovative technologies for the processing, storage and transportation of organic products.
	Information and consulting support for existing innovative solutions; sharing the practical experience in production and processing of organic products.	Create on-line information base, which highlights the peculiarities of this way of production, legal acts and infrastructure elements. Consulting centres and demo farms creation, producers' associations support.
	Infrastructure development.	Support and improvement of sales channels. Development of the institutions for organic products certification. Creation of the organic raw materials processing infrastructure.
Financial and Economic	Direct state support of organic producers. It meets the requirements of the WTO's "green basket", which increases the state regulation opportunities.	1. Support of the farmers to improve the products quality and reduce mineral fertilizers use. 2. Subsidies to organic producers or compensatory payments to producers who made transition to organic production. 3. Total or partial repayment of certification value.

	Creation of an extensive financial support system for producers.	Preferential taxation and loan, venture capital investments, insurance.
Technological	Ecologically clean lands and areas existence.	State programs to protect lands and soil fertility restoration. Strengthening the land use and environment protection control.
	Organic production technologies development.	State investments to the building, reconstruction and renovation of irrigation objects.
	Crop cultivation and animal husbandry technologies development.	Support of the commercialization of the researches done by scientific institutions, creating motivational factors for individuals.
Socio-psychological	Formation of the strategic marketing measures to create the demand.	Producer specifies ecological characteristics of the product during its positioning. Customer's perception of consumer value of organic product is not only the result of producer's efforts but of consumer culture and ecological conciseness as well. Long-term effect of organic products consumption – medication expenses decree and longer life.
	Low level of ecological consciousness	Informational support both of producers and consumers

Source: Composed by the author based on sources (Kovalenko T., 2014; Hamzaoui-Essoussi L. and Zahaf M., 2009; El-Hage Scialabba, C.Hattam (ed.), 2002)

Only with an integrated combination of organizational, legal, financial, technological, and socio-psychological preconditions it is possible to achieve systematic development of organic agriculture in the country.

3. Features of the organic agricultural products market development

The analysis of production and marketing of organic products researches and practices in different countries allowed identifying the following features and characteristics of the organic agricultural products market development and functioning (Table 2).

Table 2. Features of the organic agricultural products market development and functioning

Market Feature	Feature's Content
Demand and its factors	Demand is elastic because of the higher prices (30-50%) in comparison with the ones of conventional food and substitutes availability. Demand factors: <ul style="list-style-type: none"> – buyers' high income; – popularization of healthy lifestyle and ecological consciousness; – difference in prices with the substitute products (products of traditional agriculture); – availability of organic products and marketing efforts to stimulate the sale of these products.
Target audience	The consumers with middle and high income level, people who have a healthy lifestyle, food and non-food organic products producers.
Supply and its' factors	The proposal is elastic which is caused by the possibility of producer's return to traditional agricultural products. Supply factors: <ul style="list-style-type: none"> – limited production factors – land's appropriate quality, planting materials, plant protection products and weed control, means of labour; – peculiarity of the production process – low capital turnover, producers' territorial dispersion and seasonality of production, dependence on natural conditions, limited ability to store the products; – infrastructure development; – availability of investments and the level of their accessibility; – availability and access to technologies; – direct and indirect state support; – manufacturer opportunities to expand the market through the entry into foreign markets.
Products character and the features of conjuncture	Organic products have additional consumer properties – no harmful impurities, higher concentrations of useful amino acids, vitamins, and nutrients. Organic farming performs special functions that are not typical for the traditional agriculture: environmental and social functions. Supply is limited due to the relatively small production volumes and limited distances to which fresh product can be delivered. These organic products do not occupy a big niche in any country; they rather form their own specific market. In developed countries, demand exceeds the supply, so it is satisfied by import.
Competition	Monopolistic competition – there is an opportunity to segment the customers, product substitutes are presented,

	high prices, non-pricing competition is important.
Pricing peculiarities	The reason for organic products high prices is their high cost, which is caused by the high labour intensity per production unit and the production modernization. Only a substantial increase of demand can lead to the economies of scale. Certification costs are an important component of the value. A significant part of the value added in the structure of the retail price is formed when the product is stored, processed, transported and traded. The price includes the projected risk of the crop loss.
Sales channels	<ol style="list-style-type: none"> 1. Sales of certified processing enterprises. 2. Sales through sales cooperatives. 3. Direct sales (own stores, online stores, catering institutions, farm markets). 4. Sales to trade institutions (supermarkets and specialized stores).
Risks	<ol style="list-style-type: none"> 1. Inflation processes in the country. In a context of population' purchasing power decrease, cheap products become popular, rather than useful. 2. Increased costs. 3. Reduction of suitable farmlands or deterioration of the ecological situation in the region. 4. State policy changes, reduction of state support. 5. Bad weather conditions. 6. Partial crop losses during the transition period due to decreased production volumes in comparison with intensive agriculture. 7. The possibility of product counterfeiting and quality decline by unscrupulous competitors

Source: Composed by the author based on sources (Sokolova G., 2012; Michelsen J., Hamm U., Wynen E. and Roth E., 1999; Thompson G., 2000; Zepeda L. & Li J.,2007; Sardak, S., Korneyev, M., Simakhova, A. & Bilskaya, O. (2017)

The global market for organic agricultural products is a dynamic segment of the global market. Organic products are produced on 50.9 million hectares (1.1% of all farmlands in the world). Indicators describing the production and consumption of organic agricultural products in the world are shown in Table 3.

Table 3. The main indicators of the development of the organic agricultural products market in the world

Indicator	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of countries with data on organic agriculture	122	135	140	155	161	161	162	164	170	172	179	178
Number of organic producers, million producers	0,7	0,9	1,2	1,4	1,8	1,6	1,8	1,9	2	2,2	2,4	2,7
Organic agricultural land, million hectares	28,3	30,2	31,5	34,5	36,3	35,7	37,5	37,6	43,2	44,4	50,9	57,8
Share of total agricultural land, %	0,6	0,6	0,7	0,7	0,8	0,8	0,8	0,8	0,9	0,9	1,1	1,2
Organic market size, billion US dollars	33,2	40,2	46,1	50,2	54,9	59,1	62,8	64	72	80	81,6	89,7

Sources: The World of Organic Agriculture. Retrieved from: <http://www.organic-world.net/yearbook.html>

FiBL data on organic agriculture worldwide. Retrieved from: <https://statistics.fibl.org/world/key-indicators-world.html>

The given proves the constant growth of organic agricultural products market. Both the number of countries that produce organic food and the number of producers are growing. The amount of farmland used for organic production has increased 2 times. Compared to 2005 the market capacity has increased 2,7 times. The most of organic products are sold in developed countries. However, these regions are not self-sufficient, since production does not meet the demand. To balance the underproduction, these products are imported.

As of 2016, there were 2,7 million certified organic food producers in the world. Their distribution by regions is shown in Fig. 1. The largest number of producers in 2016 was in India (835000), Uganda (210352), and Mexico (210000).

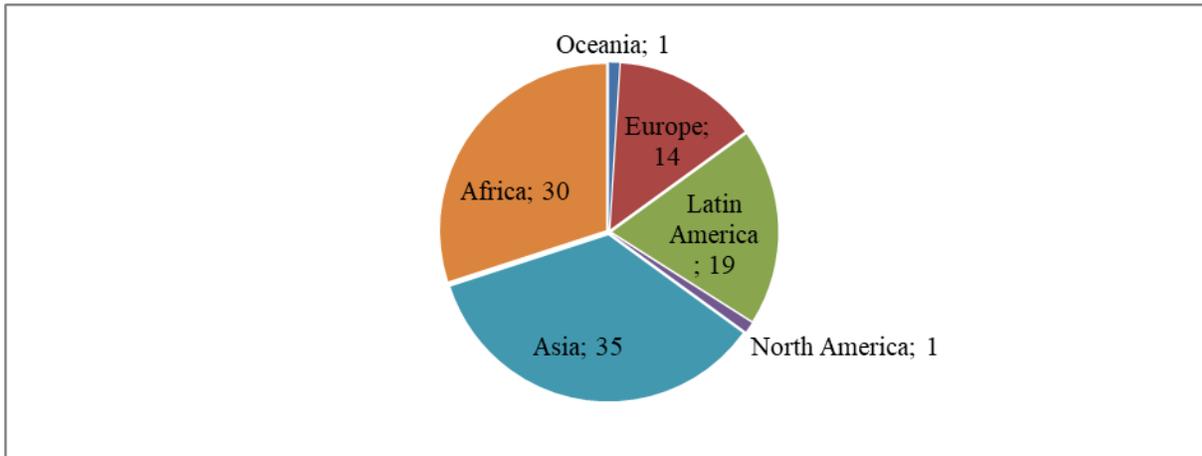


Fig. 1. Distribution of organic producers by region in 2015, %

Source: FiBL data on organic agriculture worldwide. Retrieved from: http://www.organic-world.net/statistics/statistics-data-tables/ow-statistics-data-key-data.html?tx_statisticdata_pi1%5Bcontroller%5D=Element2Item&cHash=1454ae80c62646f2ea29bd52b7a5248d

The structure of the organic farmlands is shown in Figure 2.

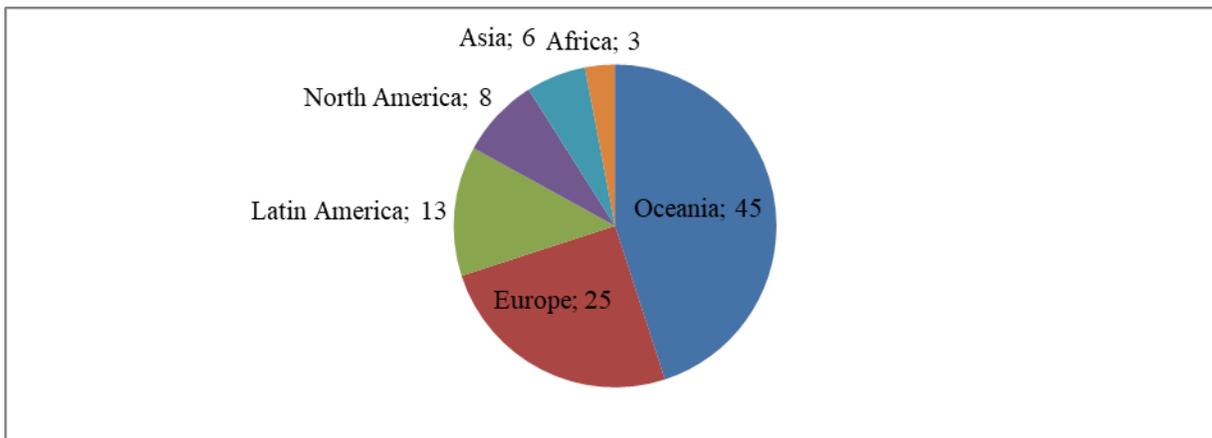


Fig. 2. Distribution of organic agricultural land by region in 2015, %

Source: FiBL data on organic agriculture worldwide. Retrieved from: http://www.organic-world.net/statistics/statistics-data-tables/ow-statistics-data-key-data.html?tx_statisticdata_pi1%5Bcontroller%5D=Element2Item&cHash=1454ae80c62646f2ea29bd52b7a5248d

The data shows that organic food production is massive in highly developed countries, and small producers predominate in developing countries. The first three countries with the largest areas of organic farmlands are Australia, Argentina, and the USA. The average size of one farm in these countries is 10046 hectares, 3078 hectares and 169 hectares respectively.

In general, the top ten countries with the largest organic farmland areas possess 31,8 million hectares, which is 73% of all organic farmlands in the world (See: The World of Organic Agriculture Yearbook, 2017).

Countries with major organic products markets include the United States (\$43,1 billion in 2016), Germany (\$10,5 billion in 2016), France (\$7,5 billion in 2016).

The volume of organic agricultural products sales by regions is reflected in Table 4.

Table 4. Retail sales by regions, Mio €

Region	2011	2012	2013	2014	2015	2016	Percentage change 2016/2011, %
Oceania	728,29	1008,82	1043,52	1043,52	1085,48	1064,6	146,2
% of total	1,6	2,0	1,9	1,7	1,4	1,3	-0,3
Europe	21391,48	22627,55	24258,21	26433,18	30008,55	33526,1	156,7
% of total	47,7	44,9	43,6	42,5	39,5	39,6	-8,1
Latin America	37,44	37,42	30,89	30,92	30,97	809,7	2162,6
% of total	0,1	0,1	0,1	0,05	0,04	1,0	+0,9
North America	20823,23	24725,15	26721,84	29585,13	38539,23	41939,1	201,4
% of total	46,4	49,1	48,0	47,6	50,8	49,5	+3,1
Asia	1893,13	1973,97	3613,12	5068,52	6254,84	7343,0	387,9
% of total	4,2	3,9	6,5	8,2	8,2	8,7	+4,5
Africa	0,27	0,27	0,27	0,27	17,27	15,9	5888,9
% of total	0,001	0,001	0,0005	0,0004	0,023	0,019	+0,018
World	44873,85	50373,2	55667,88	62161,56	75936,37	84698,4	188,7

Sources: FiBL data on organic agriculture worldwide. Retrieved from: https://statistics.fibl.org/world/retail-sales-world.html?tx_statisticdata_pi1%5Bcontroller%5D=Element2Item&cHash=35a0fcd89ae099d2ff14fe1ddb38a1aa

Growth in sales is observed in all regions except Europe and Oceania. Sales in Africa have changed most dynamically– increased 6 times. This is so due to the fact that African countries are trying to enter the world organic product markets to generate profit, since they have competitive advantages because of low industrial waste contamination. Most of the sales go to the countries in North America and Europe (mostly EU countries). They accounted for more than 90% of sales in 2016.

The dynamics of organic products consumption in the world (per capita) is shown in Figure 3.

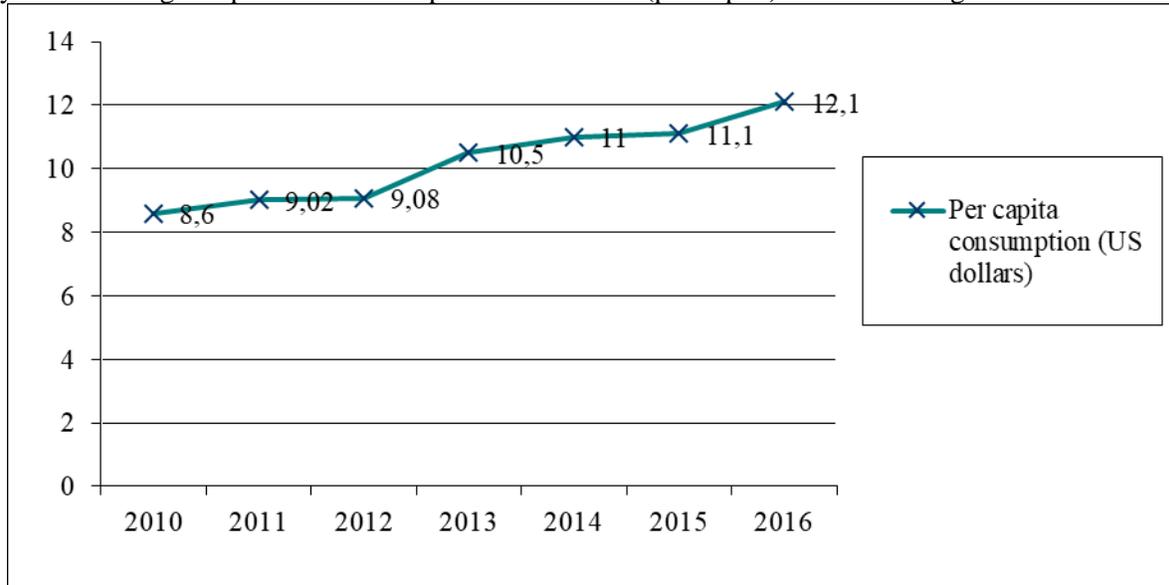


Figure 3. Per capita consumption of agrarian organic products (US dollars)

Source: FiBL data on organic agriculture worldwide. Retrieved from: http://www.organic-world.net/statistics/statistics-data-tables/ow-statistics-data-key-data.html?tx_statisticdata_pi1%5Bcontroller%5D=Element2Item&cHash=1454ae80c62646f2ea29bd52b7a5248d

The high level of organic products consumption per capita in recent years is typical for Switzerland (\$304 in 2016), Denmark (\$252 in 2016), and Sweden (\$218 in 2016) (Figure 4).

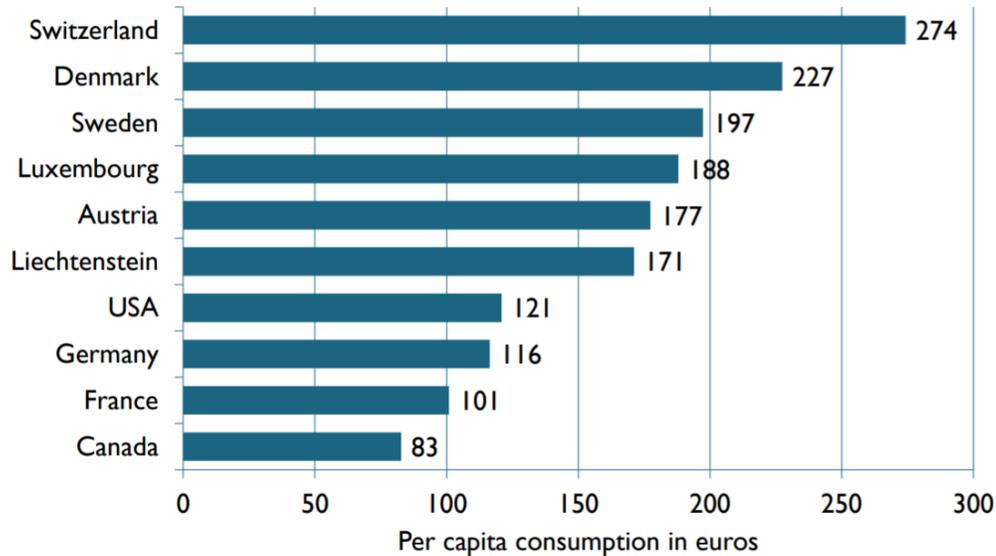


Figure 4. The 10 countries with highest per capita organic agrarian products consumption, €

Source: The World of Organic Agriculture. Retrieved from: <https://shop.fibl.org/CHen/mwdownloads/download/link/id/1093/?ref=1>

The list of these countries has remained virtually unchanged over the past five years, indicating steady high consumption of organic products in these countries. They have established markets for organic products that tend to grow. To analyze supply-demand situation it is important to analyze the structure and the dynamics of export-import operations by regions. The relevant statistics is shown in Tables 5 and 6.

Table 5. Regional structure of organic agricultural products export, Mio €

Region	2011	2012	2013	2014	2015
Oceania	246,89	237,14	383,34	383,34	398,82
% of total	4,9	3,8	5,2	3,7	3,5
Europe	2644,92	3114,94	3788,8	4218,64	4571,56
% of total	52,4	49,9	51,4	41,0	40,5
Latin America	994,01	1306,53	1283,83	1401,43	1229,36
% of total	19,7	20,9	17,4	13,6	10,9
North America	581,53	705,25	774,78	3202,83	2828,73
% of total	11,5	11,3	10,5	31,1	25,1
Asia	480,2	780,49	902,88	853,57	1848,47
% of total	9,5	12,5	12,3	8,3	16,4
Africa	101,59	98,4	231,93	232,6	401,51
% of total	2,01	1,58	3,15	2,26	3,56
World	5049,14	6242,75	7365,56	10292,41	11278,45

Source: FiBL data on organic agriculture worldwide. Retrieved from: http://www.organic-world.net/statistics/statistics-data-tables/ow-statistics-data-key-data.html?tx_statisticdata_pi1%5Bcontroller%5D=Element2Item&cHash=1454ae80c62646f2ea29bd52b7a5248d

Export volumes of organic agricultural products increased in all regions (the total increase for the analyzed period is 223%). North America has shown the highest growth (4.8 times in 2011-2015). The largest share in the structure of export belongs to Europe (40.5% in 2015), although its share declined during the analyzed period. The role of Asian and African countries in the export of organic agricultural products is increasing.

Table 6. Regional structure of import of organic agricultural products, Mio €

Region	2011	2012	2013	2014	2015
Oceania	-	177,31	107,08	107,08	107,08
% of total	-	9,5	4,2	3,0	3,3
Europe	620,77	1249,4	1332,8	1517,2	1648,58
% of total	56,3	67,1	52,7	42,0	51,1
Latin America	1,19	1,19	6,31	8,27	8,29
% of total	0,1	0,1	0,2	0,2	0,3
North America	479,7	386,22	1036,53	1942,59	1436,68
% of total	43,5	20,8	41,0	53,7	44,6
Asia	-	46,58	46,58	40,7	22,95
% of total	-	2,5	1,8	1,1	0,7
Africa	0	0	0	0	0
% of total	0,00	0,00	0,00	0,00	0,00
World	1101,67	1860,71	2529,3	3615,85	3223,57

“-” not available

Source: *The World of Organic Agriculture*. Retrieved from: <http://www.organic-world.net/yearbook.html>

The volume of organic products import increased 2.9 times during the analyzed period. The highest growth occurred in the countries of South America. In the structure of import the largest share belongs to European countries (51,1% in 2015) and North America (44,6%). Asia was the only region where the decline in import was observed.

The given data shows the growth of international trade role in the organic products market and the consolidation of new entrants – the countries of Asia and Africa.

5. Problematic aspects of the development of the world market of organic agricultural products

Several peculiarities and problematic aspects can be identified in the development of the global organic agricultural products market:

1. Own production capacity of the main consumer countries of organic products is practically exhausted, and consumption is increasing annually. In order to meet the growing needs of the population, it is necessary to expand the cooperation between developed countries and the countries with underdeveloped markets for organic products but insufficient resources for their development. These are the countries of Central Asia, Latin America, Africa, and Eastern Europe. However, this cooperation should not only involve the capacity growth, but the environmental safety strengthening also.

2. Due to the fact that the regions of organic production and consumption do not match, logistic networks should be established, and the investments in the processing of organic raw materials into goods with high value added need to be done.

3. To overcome the asymmetry of information on the organic products market, there is a need in further development of the standardization and unification systems of the quality control, including the international level.

4. The level of commodity diversification is growing, although not because of the new products, but due to the increasing the variety of types of certified goods.

5. Under the pressure of technical progress, increasing demands in the quality and safety of products, the role of vertical and horizontal integration is growing. Large farms became more competitive. Remaining alternative to small and medium-sized enterprises is a separate niche of markets for organic products.

Conclusions

World organic production has a significant potential for becoming the basis for the sustainable development of any country and the world economy as a whole. The development of the organic agricultural market contributes to the increase of the ecological and economic efficiency of the country economy. The organic products market, as well as the agricultural market in general, is characterized by specific factors of demand and supply. Factors of growing demand are: the growth of living standards and willingness to pay for product's high quality and environmental safety; increasing consumer awareness of the health benefits of organic food; the availability of organic products and marketing efforts to stimulate the sales of these products. The supply is positively affected by the following factors: product innovations and economies of scale that gradually leads to the production cost decrease and the price approximation to the conventional food products; state programs to support the producers of organic products; the availability of infrastructure; and better opportunities for producers to enter the external markets.

Research shows that the organic products market has reached the highest levels in those countries where production, consumption and quality control systems have been developed in a balanced way. The most successful experience is one of the North European countries - Denmark, Sweden, France, Switzerland, and Germany. The high level of consumers' income has also contributed to the development of this market in the US, Canada, China, and Australia.

Prospects for the development of the organic products market in the country are closely linked to the formation and development of such factor groups: organizational and legal, financial and economic, technological and socio-psychological. Such a systematization of factors makes it possible to improve and develop effective measures for the implementation of a system for organic agricultural production taking into account the influence of these factors.

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REGIONAL SPILLOVER EFFECT TO GROSS REGIONAL DEVELOPMENT PRODUCT (GRDP) IN THE SPECIAL REGION OF YOGYAKARTA, INDONESIA

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Abstract. This study aims at investigating the relationship between investment, employment, electricity consumption, GRDP of Purworejo Regency, GRDP of Magelang Regency, and GRDP of Klaten Regency to GRDP of the Special Region of Yogyakarta (DIY Province). For this purpose, this research uses time series model for the period of 2000-2016. The results show that Foreign Direct Investment (FDI), Domestic Investment (DI), Electricity Consumption (EC), GRDP of Purworejo Regency, and GRDP of Klaten Regency have significant and positive effects on GRDP of DIY Province. Also Employment has significant negative on GRDP of DIY Province. On the other hand, GRDP of Magelang Regency has no significant effect on GRDP of DIY Province. Conductive climate preparation policies for increased regional investment, productive sector mapping of the economy for labor usage, as well as good supply and distribution of electricity consumption to communities and business units are of major concerns to GRDP of DIY Province development.

Keywords: GRDP; Foreign Direct Investment; Domestic Investment; Employment; Electricity; Consumption

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1. Introduction

Regional economic development is an integral part of national economic development. This paper investigates the factors that can influence the development of a region, which is the Special Region of Yogyakarta (DIY Province) in this research. It is measured using the Gross Regional Domestic Product (GRDP) and the presence or absence of regional spillover effect.

The GRDP of DIY Province's grew from the year 2000-2016. In the year 2000, the province's GRDP was 41,828,092 million IDR, then rised up to 59,049,656 million IDR in 2008, a quite significant rise happened in

2016, it became 87,687,927 million IDR. The region's economic performance which reflected by the value of DIY.

Province's GRDP is considered good. Analyzing the growth of GRDP of DIY Province and the factors that could affect it, is an intriguing thing to do.

Mamuti & Ganic (2016) test the relationship of foreign investment toward Gross Domestic Product (GDP) by looking at the important role of foreign investment in financing economic activity in Macedonia. The research result concludes that foreign investment has positive and significant effect toward GDP and economic growth.

Besides foreign investment, domestic investment also has an important role in pushing up GDP of a country. Aziri (2017) in his research that was conducted in Macedonia in 2003-2014 specifically highlighted the role of domestic investment as a form of internal capacity of a country. The result of his research proves that domestic investment is able to give positive and significant effect for the growth of GDP in Macedonia country.

The economic development of DIY Province so far also depends on foreign and domestic investment. Because investment is one of the factors that drives the economy. The growth of foreign investment in the province are as follows: in the year 2000 a foreign investment in the form of Foreign Direct Investment (FDI) amounting 848,511,749,488 IDR, in the year 2008 increased to 961,273,289,857 IDR and in the year of 2016 foreign direct investment sky rocketed to 7,554,801,971,335 IDR. Meanwhile, Domestic Investment's (DI) growth are as follows: in the year 2000 with the amount of 1,815,182,865,869 IDR, rised up significantly in 2008 to 1,806,426,455,845 IDR and became 4,522,819,695,483 IDR in 2016.

The economic development in DIY so far is also depends on foreign and domestic investment, and labor, because investment and labor are the driving factors of the economy. The research from McFarlane et al. (2014) specifically examines the effect of labor and real wages toward the output (GDP) in Canada. The research result shows that labor has positive and significant causality relationship with GDP, and vice versa.

The amount of labor in DIY Province in the year of 2000-2016 experienced a growth. In the year 2000, the amount of labor absorbed were 1,663,503 people. But with the increase of the province's economic activity, the need for labor in the province also increased. Hence in 2008, the absorption of labor significantly rised to 1,892,205 people and became 2,042,400 people in 2016.

The increasingly advanced economic activity has occupied an important role of electrical energy consumption as an influential factor toward regional development. Al Mulali (2014), and Al Mulali & Mohammed (2015) have investigated the relationship between electricity consumption and Gross Domestic Product (GDP) in emerging countries. The result revealed that GDP and electricity consumption are co-integrated, and electricity consumption discovered having a long run positive relationship with the economic sectors.

Electricity consumption in DIY Province during 2010-2016 has increased significantly from year to year. Aside from showing the increase of household needs and efforts to support social and economic activity, it also shows that the increasing electricity consumption are always being supplied enough by the local government. In the year 2000 the electricity consumption in DIY Province was still 945,188,646 KWH, increased to 1,583,666,546 KWH in 2008, and became 2,698,238,827 KWH in 2016.

Another factor that can also affect the GDP of a country of GRDP of a region is spillover effect of the regional GRDP's influence. This research took the GRDP of Purworejo Regency which is located on the western border of DIY Province, Magelang Regency which is located in the north of DIY Province, and Klaten Regency which is

located in the east of DIY Province. The southern area of DIY is not examined because it is limited by the Indian Ocean.

This research has a difference compared to previous studies. The research result from Tamilselvan & Manikandan (2015) in India proved that Foreign Direct Investment (FDI) have a significant positive influence toward Gross Domestic Product (GDP). The weakness of the research result from Tamilselvan & Manikandan (2015) is that it only uses one independent variable, which is FDI to prove its effect on the GDP of India. The research from Baig et al. (2016) also tested the effect of FDI to GDP for South ASIAN countries (Pakistan, Nepal, Bhutan, India, and Maldivas) during 1991-2012. The results of Baig et al. research is that FDI has a positive influence on the GDP for South ASIAN countries. Likewise, research from Seyoum et al. (2015), and Sothan (2017) which only used FDI as an independent variable produced findings which stated that there is positive significant influence between FDI on GDP. The difference with this research is the previous one only used the FDI variable, there are no domestic investment, employment, electricity consumption, and spillover effect on GDP.

The following previous studies also only use one independent variable to be tested for its effect on GDP, not comprehensively as this study. Of course the following results and research contributions are limited. Fosu et al. (2016) conducted research about domestic investment in the public sector and its relationship to GDP growth in Africa. The research model used is the GMM Estimation System. The results shows that public sector investment can have a positive and significant influence on GDP growth in African countries. The better value of this study compared to Fosu et al. (2016) is the use of independent variables for domestic investment not only from the public sector but also the private sector. Research on the relationship between employment and GDP has been carried out by Malec et al. (2016). Research location was in Egypt during 2000-2013. Analysis in Malec et al. (2016) using Person correlation coefficient model. The result of his research shows that labor has a positive and significant correlation to the growth of Egyptian GDP.

GRDP of a region needs to be continuously encouraged to be improved in order to achieve high and sustainable regional economic growth. Using resources owned by the region optimally becomes an important task to achieve the desired economic growth goals. Therefore, the renewal of this research will close the gap generated in previous research by examining the influence of factors of foreign direct investment, domestic investment, electricity consumption, employment and the spillover effect of GRDP DIY, Indonesia, during the period 2000-2016.

2. Literature Review

2.1. Foreign Direct Investment (FDI)

The amount of investment becomes an important factor in increasing economic growth. This model was introduced by Romer (1986). Besides, another research has been done by Abu & Mohd Zaini (2016) during the period of 1981-2011. The result found that foreign investment in the long term has a significant and positive effect toward GDP.

Ali and Mingque (2018) also researched the impact of foreign direct investment (FDI) on real GDP growth of Asian developing countries. This study took Sri Lanka, Pakistan, Philippines and Thailand as the representative of Asian developing countries during 1990-2014. This study is analyzed by Vector Error Correction Model (VECM) and Johansen Cointegration test. The results shows that foreign direct investment in long term had significant positive effect on real GDP growth of the countries studied. FDI flows in economic sectors have succeeded to accelerate the output of economic sectors, so that it contributed in increasing real GDP growth continuously. In addition, the study also found Granger causality between foreign direct investment, gross capital formation,

government consumption, trade openness and labor to real GDP growth. This is an evidence that the government policy is appropriate in regulating the entry of FDI flows, infrastructure readiness and labour that has accelerated the effectiveness of FDI's role in economic sectors. The researchers provide recommendations to the governments of Asian developing countries to apply incentive policies to attract more foreign investment. Additionally, it is also needed for having regulations that control capital flows between Asian countries so that investment conditions can support the entry of foreign capital because FDI is proven to have significant positive effect on real GDP growth of each countries studied.

This research is also in accordance with the research result from Gaikwad & Fathipour (2013) in India, Kosztowniak (2014) in Poland, Sarfraz & Liu (2015) in Pakistan, Khan & Jehan (2015) in Pakistan, Kisswani et al. (2015) in Estonia, and Mahembe & Odhiambo (2016) in SADC countries.

2.2. Domestic Investment (DI)

The classics of economic development claims that the domestic investment contribute to economic growth, e.g recently the research that was conducted by Sánchez-Juárez & García-Almanda (2016) in Mexico during the period of 1993–2012 examines about debt, investment, and economic growth. The research concluded that domestic investment along with debt is also able to give positive and significant effect toward GDP growth of the country.

Hlotywa and Ndaguba (2017) have researched the influence of domestic investment to GDP in South Africa during 1990–2014. This study used Vector Error Correction Model and econometric cointegration models. The domestic investment in this study is measured by the amount road transport infrastructure investment. The result proved that the domestic investment gave a positive impact on real GDP growth in South Africa. Investment of infrastructure development has important role in economic development of a country. The researchers offered several recommendations on policy implication for the government. The government needs to make investment cooperation in infrastructure development, especially road infrastructure. He also needs stimulate savings that will increase the investment and creates eco-friendly investment for environment so that the investment will be increase significantly. The result of this research is strengthened by Mohamed et al. (2013) in Malaysia, Bayar (2014) in Turkey, Tan & Tang (2016) in ASEAN-5 countries, and Osabuohien et al. (2017) in Nigeria.

2.3. Electricity Consumption (EC)

Alam (2013) has conducted research on the relationship between electrical energy and GDP growth in India during the period of 1975-2008. The result shows that the consumption of electrical energy is able to give a positive and significant influence to GDP growth.

Sanchez-Lor and Zambrano-Monserrate (2015) have examined the relationship between electricity consumption (EC), gross domestic product (GDP), foreign direct investment (FDI), human development index (HDI) and remittance (RMT) in Colombia, Ecuador and Mexico. The data of this research is taken from 1980-2012. The research method used cointegration and Granger causality test. The results shows that only in Ecuador, the electricity consumption (EC) had a positive significant effect on GDP while Colombia and Mexico did not affected. It is because energy in Ecuador including electricity has a vital role. It becomes the main factors of production process beside capital and labor. In Colombia, there are two unidirectional causalities running from HDI to EC and GDP to FDI generating a positive effect. It also has bidirectional causality between HDI and RMT reflecting enhancing feedback in the long-run. However in Mexico, EC causes FDI in the short-run within a positive interaction, and FDI and HDI sustain short-run unidirectional causalities affect the RMT negatively exerted from FDI and positively from HDI.

Long et al. (2018) also have conducted research to examine the effect of electricity consumption and foreign investment on real GDP growth in Vietnam during 1990-2015 by using the Toda-Yamamoto approach and the distributed lag autoregressive approach (ARDL). One of the prerequisites for the successful implementation of industrialization and national modernization is the synchronous development of fundamental industries.

Electricity is a key industry that determines the success of other industries. The results of his study explained that there is a strong and significant positive relationship between electricity consumption and foreign direct investment in Vietnam's economic growth both in the short and long term period. If the development of electricity consumption and foreign investment can be increased, it will have a positive impact on Vietnam's real GDP growth. The same finding is obtained from the research of Akpan & Akpan (2012) in Nigeria, and Tewathia (2014) in Delhi.

2.4. Employment (EM)

The theory about the relationship of labor toward GDP is introduced by Solow (1956). According to the theory, factors that have positive influence toward the GDP value of a country or GRDP for a region is the amount of investment and labor with the model of $Y = F(K, L)$.

Kaseeram and Mahadea (2017) have investigated study of relationship between labor and real GDP growth in South Africa. The study used annual data during the period 1946-2015. It is analyzed by VAR/VECM time series method with Johansen co-integration test. The results show that there is a significant long-run co-integrating relationship between labor and real GDP growth in South Africa. That relationship is positive. It means that the more countries in South Africa have labors, it will increase real GDP growth (economic growth) in the country. Then the researchers provided recommendations to improve the quality of workers and to provide more labor markets. It is required because a broad labor market and enhancement of quality workforce are needed to have a positive effect on real GDP growth (economic growth).

Gohman et al. (2016) also have researched the labor and the real GDP growth. Labor variables are divided into two, there are productive and unproductive labor. The study was conducted in the United States during 1990–2012 and had different conclusions for different cases. First, the labor has a positive significant effect on real GDP growth (economic growth). It is because the research workforces are productive labors. Second, the labor has a negative significant impact on economic growth, it happens because the researchers took unproductive labor as the variable. Therefore labor productivity is able to give different direction impact on real GDP growth (economic growth). Researchers explained that the industrial sector can not directly influence economic growth but it is more affects on relationship of the labor and the industry, if relationship between industrial and labor are better, it will increase the labor productivity too.

Ismail & Yuliyusman (2014) have done a research about the relationship between foreign workers toward the economic growth in Malaysia. The research result explains that skilled that owned by foreign workers can give a positive and significant effect toward GDP. This result is in accordance with the findings from Nayyar (2014), McFarlane et al. (2014) in Canada, Maitah et al. (2015) in Belgium, and Asad et al. (2016) in Pakistan.

2.5. Spillover Effect of GRDP

This study about regional development is based on the theory initiated by Romer (1986), which states that science is the most important production factor for increasing the output of a region and have spillover effect on another region. Rho & Moon (2014) in their study in China conclude their finding that the impact of connection and interaction of inter-regional economy (spillover effect) is an important factor for the increase of economic capability in the region. The same finding is obtained from the research of Kleynhans (2016).

Based on the above literature review, the hypotheses of this research are:

H1: Foreign Direct Investment has a positive and significant effect on the GRDP of DIY Province H2: Domestic Investment has a positive and significant effect on the GRDP of DIY Province

H3: Employment has a positive and significant effect on the GRDP of DIY Province

H4: Electricity consumption has a positive and significant effect on the GRDP of DIY Province H5: GRDP Purworejo Regency has a positive and significant effect on the GRDP of DIY Province H6: GRDP Magelang Regency has a positive and significant effect on the GRDP of DIY Province H7: GRDP Klaten Regency has a positive and significant effect on the GRDP of DIY Province

3. Research Methodology

3.1. Instrument

This study uses time series data across ranging from 2000 to 2016 from DIY Province, Purworejo, Magelang, and Klaten Regencies. The dependent variable is GRDP of DIY Province and the independent variable includes foreign direct investment, domestic investment, employment, electricity consumption, GRDP of Purworejo Regency, GRDP of Magelang Regency and GRDP of Klaten Regency.

3.2. Data Analysis

The data is analyzed using the logarithm regression model:

$$\text{LogGRDPDIY}_t = \beta_0 + \beta_1 \text{LogFDI}_t + \beta_2 \text{LogDI}_t + \beta_3 \text{LogEM}_t + \beta_4 \text{LogEC}_t + \beta_5 \text{LogGRDP Purworejo}_t + \beta_6 \text{LogGRDP Magelang}_t + \beta_7 \text{LogGRDP Klaten}_t + e_t \dots (1)$$

Where:

GRDP= Gross Regional Domestic Product (in millions IDR); FDI = Foreign Direct Investment (in IDR); DI = Domestic Investment (in IDR); EM=Employment (in people); EC = Electricity Consumption (in KWH); β_0 = constant; β_i = coefficient; $i = 1,2,3,4,5,6,7$; t = the period 2000-2016; and e = error term. All variables are stated in logarithm.

4. Result and Discussion

The analysis of this study began with the MacKinnon, White and Davidson (MWD) test that found the best model. It was the logarithmic regression model. This model is chosen because the probability value of Z1 is significant. It is 0.0020, smaller than alpha 0.05, so that the best model is the logarithmic regression model. While the probability value of Z2 is not significant because it is 0.2916, greater than alpha 0.05, so the best model is the logarithmic model. The form of regression results in logarithmic regression models are shown in Table 1 below.

Table 1. Regression Result

Dependent Variable: LOG (GRDP DIY) Method: Least Squares
Sample: 2000 2016

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.554799	0.243175	10.50601	0.0000
LOG(FDI)	0.001811	0.000478	3.791515	0.0043 ^{a)}
LOG(DI)	0.014401	0.007041	2.045428	0.0711 ^{c)}
LOG(EM)	-0.059215	0.018739	-3.159916	0.0116 ^{b)}
LOG(EC)	0.154895	0.032778	4.725591	0.0011 ^{a)}
LOG(GRDP PURWOREJO)	0.467483	0.089149	5.243821	0.0005 ^{a)}
LOG(GRDP MAGELANG)	0.034943	0.096308	0.362821	0.7251
LOG(GRDP KLATEN)	0.269377	0.079313	3.396382	0.0079 ^{a)}
R-squared	0.999935	Mean dependent var		17.90365
Adjusted R-squared	0.999884	S.D. dependent var		0.235640
F-statistic	19731.53	Durbin-Watson stat		3.087877

Note: ^{a)}= significant at 0.01; ^{b)}= significant at 0.05; ^{c)}= significant at 0.10 level respectively

After completing the MWD test and getting the best model, the next steps make the Classical Assumption test, including normality test, multicollinearitytest, heteroscedasticity test and autocorrelation test. The result shows that the best model passed for all assumptions on the Classical test.

4.1. Foreign Direct Investment (FDI)

Based on the result of t test, it can be concluded that FDI has a positive and significant effect toward GRDP of DIY Province with the coefficient value of 0.001811, which means that if the FDI rises 1 percent, then the GRDP of DIY Province will rise by 0.001811 percent. Finding of this study shows that the driver of main economic activity sectors in DIY Province especially industry and service, are supported by FDI. Beside that, the presence of FDI also shows that the province uses an open economic policy.

Jimborean and Kelber (2017) have studied about the effects of foreign investment on real GDP growth in Eastern European and Central European countries during 1993 to 2014. The study used a dynamic panel data analysis model and had conclusion that the foreign investment has a positive significant effect on real GDP growth. This foreign investment can be increased through the creation of macroeconomic stability, stability of labor costs, and improves adequate infrastructure access.

Meanwhile, Bose et al. (2017) has also examined the relationship of foreign investment to real GDP growth and exports in Bangladesh during 1996–2013 by using the three simple linear regression model. The result of his research is foreign investment had a positive and significant effect on real GDP growth and Bangladesh exports. The problem that inhibits foreign investors from entering Bangladesh are an unstable political condition, the lack of infrastructure development and limited land for investment.

This finding is also accordance with the findings from Mamuti & Ganic (2016), Ouhibi et al. (2017), and Reza et al. (2018) and Caesar et al. (2018) which prove foreign investment is important to increase GDP growth in a

country. But this result is contrary to the results of research conducted by Shakar & Aslam (2015) in Malaysia, and Nguyen & Zhu (2017) in Vietnam, which found that FDI had no significant effect on GDP.

Shakar and Aslam (2015) also found the same thing in their research in Malaysia, there is no significant relationship between foreign direct investment and real GDP growth. This is due to economic growth in Malaysia during the study period between 1980-2010 influenced by other factors besides foreign investment. The researcher admitted that the research findings were different from the previous studies, according to him, Malaysia has begun to experience a shift in the determinants of economic growth factors from foreign direct investment to human resource investment.

Nguyen and Zhu (2017) has conducted research in Hanoi (Vietnam). The study examined the impact of foreign direct investment on economic growth in Hanoi. They got conclusion that the foreign investment is unable to contribute on Vietnam's real GDP growth in the short term, whereas in the long run, the influence of foreign investment on real GDP growth is still smaller than domestic investment in the public sector. Foreign investment does not contribute on Vietnam's real GDP growth because foreign investors often have difficulty investing as a result of complicated administrative procedures.

4.2. Domestic Investment (DI)

Based on the result of t test, it can be concluded that domestic investment has a positive and significant effect toward GRDP of DIY Province with the coefficient value of 0.014401. This means that if the DI rises 1 percent, then the GRDP of DIY Province will rise by 0.014401 percent. This proves that the role of domestic investment is important, even more dominant compared to the role of FDI in increasing the GRDP of DIY Province (Feriyanto, 2016). DI's role shows that besides FDI, the use of DI has encouraged increase in output and in turn DIY Province GRDP.

This result study supports the research findings from Makuyuna & Odhiambo (2017) in Zimbabwe. Their study revealed that the domestic investment had a positive effect on real GDP. According to them, it happens because the public sector investment has a greater impact on economic growth in short term. Meanwhile in long term, investment in the private sector has more significant impact on real GDP growth. Therefore, the government needs to give development priorities from the use of short-term investments to the public sector, on the other hand, long-term development priorities can be left to the private sector.

Shvets S. (2018) also examined domestic public sector investment and its relationship to economic growth in Ukraine. The study used VECM model and gave conclusions that public domestic investment has positive influence on real GDP growth. In short run, public investment becomes a significant driver on real GDP growth, while in the long run, the increase of public investment can also raise real GDP growth. In addition, researchers give recommendations to the government to create a good investment climate through pro-investment policies both in the short and long term. It is required because of considering that domestic investment has proven to have a positive significant impact on Ukraine's economic growth.

This result is also strengthened by the findings from Sánchez-Juárez & García-Almanda (2016), Osabuochien et al. (2017), and Aziri (2017). Alas this result is contrary to the results of research conducted by Zhang (2014) in China, and Omoregie & Ikpesu (2017) in Nigeria, which found that domestic investment (DI) did not have a significant relationship to Gross Domestic Product (GDP). It happens because DI is used in less productive sectors in the country so that it does not have a significant impact on the country's GDP.

4.3. Employment (EM)

Based on the result of t test, it can be concluded that employment has a negative and significant effect toward GRDP of DIY Province with the coefficient value of -0.059215. This means that if the Employment rises 1 percent, then the GRDP of DIY Province will down by 0.059215 percent. This indicates that market labor in DIY has experienced saturation and inefficiency, so when there is an addition of labor absorption, it will have an impact to the decrease of GRDP of DIY Province. The use of labors in agriculture and forestry sectors in DIY Province isn't effective because of the declining productivity. It happens because the proper support irrigation and productive of agricultural land are decreasing. The increase of labor usage which cant produce increased output, made the GRDP of agriculture and forestry sectors continues to decrease.

The research of Kaushik et al. (2015) in Philipina, Bonga-bonga & Ahiakpor (2016) in Ghana, and Turkovic (2017) in Iran had examined the effect of employment toward GDP riil, and found employment usage had a negative relationship with GDP riil growth.

Kaushik et al. (2015) in his research in several ASEAN countries, proved that labor has a negative effect on real GDP growth. The study used a standard model of real GDP growth that is a function of size government, labor force, and capital. Related to the labor, this study made conclusion that employment has a negative and significant relationship with real GDP growth in Philippines. It is caused by excess labor supply.

Bonga-bonga & Ahiakpor (2016) have studied about what factors affect on real GDP growth in Ghana. The research conducted in the period 2001–2014 and applied the BMA analysis method. The measured variables are GDP as dependent variable and population density, crop production, inflation rate, amount of labor, current account balance and population growth as the independent variables. The results of study indicate that one independent variable, amount of labor, has a negative significant effect on real GDP growth in Ghana because there are still more workers who work in the public sector. The public sector has not given much influence to the country's economy. Therefore, the researchers then give recommendations to the government to improve and to facilitate policies that support the entry of investment in the private sector. The private sector investment will increase the demand of private sector labor so that it can give positive effect on real GDP growth in Ghana.

Research on labor and growth in real GDP (economic growth) has also been carried out by Turkovic (2017) in the Islamic Republic of Iran during 1974-2014, used the ARDL and ADF test methods. The results show that labor has a negative and significant effect on real GDP growth in Iran. In addition, other variables, capital and technology give opposite significance. The negative effect of labor on real GDP growth happens because labor productivity is still relatively low and there is limited capital, so that the impact of the increase in labor on output growth (real GDP) will be decreasing.

4.4. Electricity Consumption (EC)

Based on the result of t test, it can be concluded that the variable of electricity consumption (EC) has a positive and significant effect toward GRDP of DIY Province with the coefficient value of 0.154895. This means that if the electricity consumption rises 1 percent, then the GRDP of DIY Province will rise by 0.154895 percent. Many economic activities in DIY Province use electricity, especially for Small, and Medium Enterprises (SMEs) and other trade activities that have a positive impact on the GRDP of DIY Province. A lot of SMEs in DIY Province depend on the use of electricity to produce their output. DIY is a province with lots of schools, universities, hotels and restaurants, so it requires a lot of electricity in each of its activities.

Albiman et al. (2015) examined the effect of electricity consumption on GDP growth in Tanzania during the period 1975–2013. The results show that electricity consumption can give a positive influence on GDP growth in

the country. Electricity consumption has been proven to increase people's economic activities in various sectors so that it has a positive impact on GDP growth in Tanzania.

Next, Hossen and Hasan (2018) also studied about the effect of electricity consumption on real GDP growth in Bangladesh during the period 1972-2011, used time series data analysis model and ADF and Phillips-Perron data stationary tests. The results show that there is a positive significant relationship between electricity consumption and real GDP growth. It can happen because the electricity consumption has proven to drive people's economy through the dominant sectors of the economy in Bangladesh. The socialization of efficient use of electrical energy is required, so that people can get greater economic value added.

This study finding is in accordance with the findings from Hossain & Saeki (2012) which examines the causality relationship between electricity consumption and GDP in 76 countries. But the results of this study are different from the results of Asongu et al. (2016), Alley et al. (2016), Yasar (2017), and Tamba et al. (2017) who found that electricity consumption did not have a significant effect on GDP.

The results of research that is conducted by Asongu et al. (2016) explained that the electricity consumption sector did not have a strong influence on GDP. They took 24 countries in Africa as research samples and used the Auto Regressive Distributed Lag (ARDL) panel method. The results of their research mentioned that the causality relationship between electricity consumption and GDP is not too strong. It is due to the level of responsiveness of electricity consumption to GDP is at a minimum level, therefore it is necessary to use more renewable energy based on fossils. If it can apply in Africa, it will give a stronger influence on increasing GDP in Africa countries.

Alley et al. (2016) conducted a study to examine the effect of electricity consumption on GDP in Nigeria. The study found a conclusion that the use of electrical energy can not affect significant directly on GDP. This is due to the use of electrical energy that is widely used in the industrial sector has not affected the increase of output of industrial sector maximally because the industrial sector is not developed well in Nigeria. The government needs more serious efforts until an increase of industrialization process is more intensive can occur in the country, so that it can give impact on the increase of output of industrial sector that contributes greatly to GDP growth in Nigeria.

Yasar (2017) in his research on the effect of energy consumption on GDP, took electricity energy as his research variable. From 119 countries studied, it was found that there is no significant relationship in short-term and long-term between electricity consumption and GDP in low-income countries. Likewise in the middle-lower income countries, there is no significant effect on short-term causality. It happens because the middle-lower income countries is still in early development process. It means the production proces is still based on conventional technology methods where the use of electricity energy is still limited. Therefore, the output is still low.

Meanwhile, Tamba et al. (2017) in his research in Cameroon during 1971-2013, used an econometric approach through the Johansen co-integration test, Vector Auto Regressive (VAR) method, and Granger causality test, found that electrical energy consumption did not have a significant effect on GDP growth. According to the researchers, it is caused by the lack of electricity supply in the country than its demand. Cameroon is actually a very large hydroelectric potential country, however, its potential can not be utilized optimally in order to fulfill electrical energy needs. Therefore, the government should take an intensive policy in the framework of increasing, producing, distributing electrical energy so that it can provide a good influence in the future in the state revenue sector, especially Cameroon's GDP.

4.5. GRDP of Purworejo Regency

Based on the result of t test, it can be concluded that the GRDP of Purworejo Regency has a positive and significant effect toward GRDP of DIY Province with the coefficient value of 0.467483. This means that if the GRDP of Purworejo Regency rises 1 percent, then the GRDP of DIY Province will rise by 0.467483 percent. Purworejo Regency is well-known for its agricultural products. Cooperation between agro-industry and SMEs in the form of forward linkage strongly supports the GRDP development and become a positive spillover effect.

The finding of this study strongly supports Drummond & Liu (2015). According to the findings, there is a spillover effect between the rises of the Chinese economy with the other country economies such as sub-Saharan Africa. In addition, this findings result is also in accordance with the findings from Jiang et al. (2016).

4.6. GRDP of Magelang Regency

The variable analysis result of the GRDP of Magelang Regency shows that this variable is insignificant effect toward the GRDP of DIY Province, because the probability is greater than $\alpha = 10$ percent ($0,7251 < 0,10$). The reason for the insignificant GRDP of Magelang Regency is because the product of the main sector in this regency is the final product that the marketing and consumption is done in this regency. It means there is economic independence in the GRDP of Magelang Regency. Besides being a producer, Magelang Regency residents also consumed the output produced as well as other regencies in the north and west of Magelang Regency, but not DIY Province residents.

The findings of this study in line with Alsharairi & Abubaker (2016) which examined the effects of spillover in the United Arab Emirates (UAE) during 2009-2013. Alsharairi & Abubaker focus on the discussion of the impact of countries movement around the Middle East on economic conditions in the UAE. They found condition of economic, political and security in Middle Eastern countries has not affected the economic conditions in the UAE. It means that there is no spillover effect, especially viewed from the financial market's condition. According to researcher, it happened because the UAE has more stable economy compared to its neighbor, this stability is not only in economic terms but also includes politics and security.

The findings of this study supported Huajun (2017) who examined regional disparity in China during 1992-2013. The model used in Huajun was DMSP/OLS with the data of 291 cities in China. Huajun found that several regions in northern China and Guangdong Province contributed an increase in disparity in China. This means that until now, the North China and Guangdong regions have not been able to provide spillover effects for the surrounding areas. The researcher argued that the absence of a spillover effect was due to the fact that the area was in the developed region category but the 'downward transition' probability was relatively small. The area is an advanced industrial area with high economic growth. In order to provide a positive spillover effect for China, it is necessary to have a government policy to balance economic growth that can be done by coordinating policies between regions in China.

4.7. GRDP of Klaten Regency

Based on the result of t test, it can be concluded that the GRDP of Klaten Regency has a positive and significant effect toward GRDP of DIY Province with the coefficient value of 0.269377. This means that if the GRDP of Klaten Regency rises 1 percent, then the GRDP of DIY Province will rise by 0.269377 percent. The variable of regional spillover of GRDP of Klaten Regency has a positive and significant effect toward GRDP of DIY Province. It cannot be separated from the same type of industry between Klaten Regency and DIY Province. In producing competitive output, the industrial sectors of both Klaten Regency and DIY Province collaborates each other. This study is in accordance with the study from Kamaraj & Kathiravan (2013), and Kleyhnans (2016).

5. Conclusion

This study aims at investigating the relationship between Foreign Direct Investment (FDI), Domestic Investment (DI), Employment (EM), Electricity Consumption (EC) and GRDP of Purworejo Regency, GRDP of Magelang Regency, and GRDP of Klaten Regency toward the GRDP of DIY Province, which makes this topic is very important to discuss. The result shows that while FDI, DI, EC, GRDP of Purworejo Regency and GRDP of Klaten Regency have a positive and significant effect, the employment (EM) has a significant and negative effect on GRDP in the DIY province. However, GRDP of Magelang Regency variable do not significantly affect GRDP in the DIY province.

6. Implication and Limitation

The implications of the findings should help the government of DIY Province in making policy regarding to improve the GRDP of DIY Province. Economic cooperation between Purworejo and Klaten Regency is very important to be improved, because positive spillover effect has a role in the increase of the GRDP of DIY Province.

Community empowerment especially SMEs and the products in supporting forward linkage has a very important role in increasing public income. Supply of electricity that is sufficiently needed to anticipate the increase in electricity consumption due to the increased activity of SMEs. Domestic and foreign investments need to be improved through creating a conducive climate for regional investment. Besides, productive economic sectors need to get serious attention from the government through policy and budget support so that they can become the dominant sector in contributing to GRDP DIY.

The use of labor in the Province of DIY also needs to get serious attention because the condition has negative impact toward the GRDP of DIY Province. It needs an in-depth study to the less productive sectors of economic in using labor, and the preparation of labor skill that is in accordance with the needs of the economic sector is also need to be done.

The limitation in this study is that the research only focused on DIY province in the 2000-2016 period. The result certainly cannot represent the entire 34 provinces in Indonesia, because each has different characteristics. Further research can be done with a broader area of research that is nationally (Indonesia) with a longer research time so that it can produce a more complete study and more contributions.

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ANALYSIS OF THE OIL, PRICE AND CURRENCY FACTOR OF ECONOMIC GROWTH IN AZERBAIJAN

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Abstract. The article examines the main macroeconomic indicators of the Azerbaijani economy, including GDP, GNI, CPI, exchange rate, fixed assets, investments, etc. Using statistical data of 2000–2016, the main factors influencing oil production and dependence on oil prices are determined, and econometric equations (models) are established and evaluated. In addition, the same macroeconomic indicators, combined with oil production factors and oil prices, created a complex regression equation that reflects the dependence of manat on the dollar and the CPI. Meanwhile, all the data were compared both with the previous year, and with the base year (2000=100). the statistical significance of the regression and correlation parameters in the models was calculated using the EViews 9, PASW Statistics 18 and Gretl software packages for each parameter (Sig. $p < 0.001$, $p < 0.01$, $p < 0.05$) for each parameter. An economic interpretation of obtained results is provided.

Keywords: CPI, GDP, GNI, exchange rate, econometric models

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1. Introduction

In general, as in the whole world, the calculation of macroeconomic indicators in Azerbaijan and the identifying factors that influence them are of great importance, and significance of this research is emphasized. The key issue is find our how the economic development of the state, estimated by Gross Domestic Product (GDP), Gross National Income (GNI), Consumer Price Index (CPI), exchange rate, volume of investments, etc. depends from accurately selected and properly assessed impacting factors. At this time, many tools of economic, statistical and

econometric analysis can be used. The economic development of the world economy and its position in the world economy are determined by goods, services and resources that have a definite and relative advantage over the world market. From this point of view, Azerbaijan exports to the world market a hydrocarbon (oil and oil products), its richest natural resource. Naturally, its economy depends on market positions, market supply and world market prices for these products. As in these countries, the exchange rate of the national currency of Azerbaijan's manat depends on the world cost of these resources and the volume of production in Azerbaijan.

2.1. Literature review

Classic theories claim the economic development of any country has been influenced by physical and human capital (Solow 1956; Romer 1986; Lucas 1988). Besides those basic drivers of development, economic development is affected by array of other factors, such as institutional, legal, demographic, geographical, social and economic and political factors (e.g. Barro, 1999, 2003; Sachs and Warner, 1997; Burnside and Dollar, 2000, Easterly and Wetzel, 1989; Barro, 1990; Barro and Sala-i-Martin, 1992; Tvaronavičienė, Razminienė 2017; Mishenin et al., 2018; Mishenin et al., 2018; Kisel'áková et al., 2018).

Some strand of scientists researched dependence of economic increase on currency rate in developing countries. Thus, Dollar (1992) studied macroeconomic stability and economic increase in 95 developing countries during 1976–1985, Fischer (1992) studied stability and economic increase in Sahara region of Africa and Latin America and Carribean basins, Anyanwu (2014) studied several factors including inflation, price of agrarian product and analyses of oil price factors influencing economic increase in Africa during 1996–2010 and China during 1984–2010. Mundell (1963) and Tobin (1965) concluded that high inflation led to a decline in investment and capital inflows and low economic growth, and Fisher (1991) concluded that a theoretical framework would require long – term macroeconomic stability to improve the viability of economic growth.

2.2. Influence of currency rate to macroeconomic indicators

By De Grauwe and Schnabl (2008) the impact of the economic growth rates of the fixed exchange rate in 18 states of Southeast and Central Europe in 1994–2004 was examined with the help of the Dollar (1992), Easterly and Levin (1997), De Grauwe and Schnabl (2008) examined the relationship between economic growth and the exchange rate. After the World War II, many countries in the world have initially introduced a more aggressive economic policy to increase the real GDP (Crafts, 2000). Mlambo and Oshikoya reviewed macroeconomic developments in Africa in terms of real GDP growth and the real exchange rate. Many economists studied macroeconomic indicators, e.g. inflation in GDP (Dunis and Triantafyllidis 2003, Wadhvani, 1986), the exchange rate (Goudie and Meeks, 1991). Ismikhan M. (2003) used inflation to determine the index of macroeconomic instability in Turkey, the ratio of external debt to GDP, the rate of budget deficit to GDP and the exchange rate. At the same time, Sánchez-Robles (2006) concluded that one of the factors causing macroeconomic instability in Spain in 1962 – 1995 is inflation. Kaneko and Lee (1995) outlined 8 factors among the factors affecting stock markets between the US and Japan, including oil prices, inflation and exchange rate fluctuations.

International financial shocks or crises depend on the exchange rate of economic systems and macroeconomic indicators (Dornbusch, 1976, Frankel, 1979, Bilson, 1981, Fama, 1984, Olivei, 2002, Campa and Goldberg, 2005, Cunado and De Gracia, 2005, Gehrke and Yao, 2013, Chang and Su, 2014, Gehrkea and Yaob, 2014, Audzei and Brázdik, 2015). At the same time, when analyzing the effect of exchange rate fluctuations (Blomberg et al., 2005), it was concluded that in economic systems with a huge manufacturing industry, there are some changes in the exchange rate and the choice of currency.

Faia and Iliopoulos (2010) reviewed exchange rate relations and noted that an optimal fiscal policy requires a stable exchange rate to move from fixed rates. Parveen et al. (2012) reported that inflation is a key factor affecting

the exchange rate, while Macdonald and Ricci (2004) found that real commodity prices rose 1% due to an increase of about 0, 5% of the real exchange rate. Khan et al. (1996) stressed the importance of the exchange rate in determining inflation growth. Choudhri and Khan (2002), Hyder and Shah (2005), Feenstra (1989); Olivey (2002) and Kampa and Goldberg (2005) studied the relationship between inflation and exchange rate both at the exchange rate and at the exchange rate.

2.3. Oil price and economic increase

Adebiyi et al (2009) determined the relationship between the oil price shock and the real exchange rate, Ghosh et al. (2010) determined the price of oil on the stock market. Hamilton (1983), one of the first scientists who studied dependence on oil price shocks and macroeconomic indicators, studied the economic cycle from 1948 to 1981. Mork, (1989), Pierre (1989) analyzed the positive and negative aspects of oil price fluctuations, Chaudhuri and Daniel (1998) noted that oil prices have a different effect on the US dollar exchange rate, Li Nee and Raati (1995) study 1944–1982 impact of the shock of oil prices on the US economy, in other words, GDP, and concluded that there is a correlation between them.

Hamilton (2008) argues that rising oil prices are more important than its fall. In addition, Imenez – Rodriguez and Sanchez (2005) investigated the impact of oil price shocks on real economic activity in the euro zone's industrial area and found that price increases exerted a stronger impact on GDP than the fall in prices, L'oeillet and Licheron (2008). We studied oil prices and inflation in the eurozone in 1970 and 2007. Hedayeh and David (2007) examined the impact of oil prices on US GDP in 1986–2006 and said that consumption, investment and government spending had a positive relationship with oil prices. Yu Xin (2007), examining the impact of rising oil prices and macroeconomic changes on a real product in Germany, concluded that such high prices did not have a negative impact on product volumes.

Moreover, Löschel and Ulrich (2009) concluded that the change in oil prices between 1973 and 2008 affected the German labor market and led to an increase in unemployment. In most research in which change of oil price in industrialized countries was studied, it was concluded that GDP growth rate and salary was decreasing during the oil crisis, which leads to inflation. However, the results of Blanchard and Gali (2008) were completely opposite, which meant that Japan's GDP did not decrease with the impact of oil price shock, but rather increased and could not find the reason. Tian (2010) also studied the impact of oil prices on Japan's GDP in 1984–2007.

Francois and Mignon (2008) drew attention to the relationship between oil prices and macroeconomic performance in the three OECD countries, oil importing countries and oil exporting countries.

Nagy and Al–Awadi, Mohammad (2001) concluded that, as a major oil exporter between 1984 and 1988, the impact of oil prices on Kuwait's economy was highly dependent on oil and key macroeconomic indicators. Philip and Akiney (2006) published articles in Nigeria during the period 1970–2003 at real oil prices, the consumer price index, the real exchange rate, the five – step model reflecting real GDP, the real exchange rate of fluctuations in prices on oil and investigated the impact on money supply, inflation and said that, along with oil prices, the impact of money supply and the real exchange rate on its influence also affects economic activity. Oil prices have concluded that the impact on inflation and production is low. Marcel (2011) noted that the change in oil prices in Indonesia between 1990–2008 and 1998–2008 was heavily dependent on the impact of consumption and investment in the public sector, and Afia (2008) found that oil prices in Pakistan have a non – linear impact on production.

Katsuya (2008) studied the impact of oil prices and monetary and credit shocks on the level of real GDP and inflation in Russia in 1997–2007. He also noted that the impact of monetary shocks on the economy is stronger than the shock of oil prices. This contradicts the report of Hamilton and Henry (2004). The situation in Iran was

somewhat different. According to Mohammad and Gunther (2008), Iran's main revenues are oil exports, its price fluctuations are strong in the economy, macroeconomic indicators and GDP. That is, the positive impact of rising oil prices on the economy has a negative impact.

Turning to one of the industrialized countries, Hilde (2009) found that Norway's economy responded to higher oil prices with an increase in aggregate wealth and aggregate demand. Moreover, the impact of oil price fluctuations on the economy of South Korea and macroeconomic indicators that are gradually developing and in accordance with the developed economy of the IMF were analyzed by Rumi et al., (2010). Considering the impact of oil prices on the economy and the strategic importance of these changes, he observed his influence on industrial production and interest rates and came to the conclusion that the stock market is more likely to be affected, but only to quickly adjust the balance.

Determining the impact of oil price fluctuations on China's economic activity and macroeconomic performance in recent years, Jing He (2005) found that, based on an analysis of macroeconomic indicators for 1999–2004, as oil prices depend on China's price system and, in general, price of imported oil product of economic system, the higher price is, the more negative influence is to it and economic activity.

Though it is noted that many economists reported on the impact of the above oil prices on many macroeconomic indicators in their work, but the impact of these prices on the exchange rate (Cunado and De Gracia, 2005), oil prices and exchange rates were clearly contradictory. Hutchison (1993), Hamilton (2008), Inenez – Rodriguez and Sanchez (2005) investigated the impact of oil prices on the exchange rate for the economy. Chaudhuri and Daniel (1998), Amano and Norden (1998), Rautava (2007), Akram (2007), Dawson (2007), Al–Mulli et al. (2010), Ito (2010), Ghosh (2011) studied the relationship between exchange rates and oil prices in individual countries and concluded that there was a close relationship between them.

3. Results

3.1. Macroeconomic review

GDP in the period of oil boom 2014 reached to its high level. In that year it reached to 59014.1 million manat and increased by 27.7 times compared to 1995, 12.5 times compared to 2000, 4.7 times compared to 2005, 1.3 times compared to 2010. This indicator in dollars was as following: increased by 31.2 times compared to 1995, 14.3 times compared to 2000, 5.7 times compared to 2005, 1.5 times compared to 2010, 75234.7 million dollars. For certain reasons GDP in manat decreased by 7.9% compared to 2014 in 2015 and increased by 2 % compared to 2014 in 2016. However, this indicator was different in dollars: it decreased by 30.6 % compared to 2014 in 2015 and by 49.8 % compared to 2014 in 2016 (Fig.1).

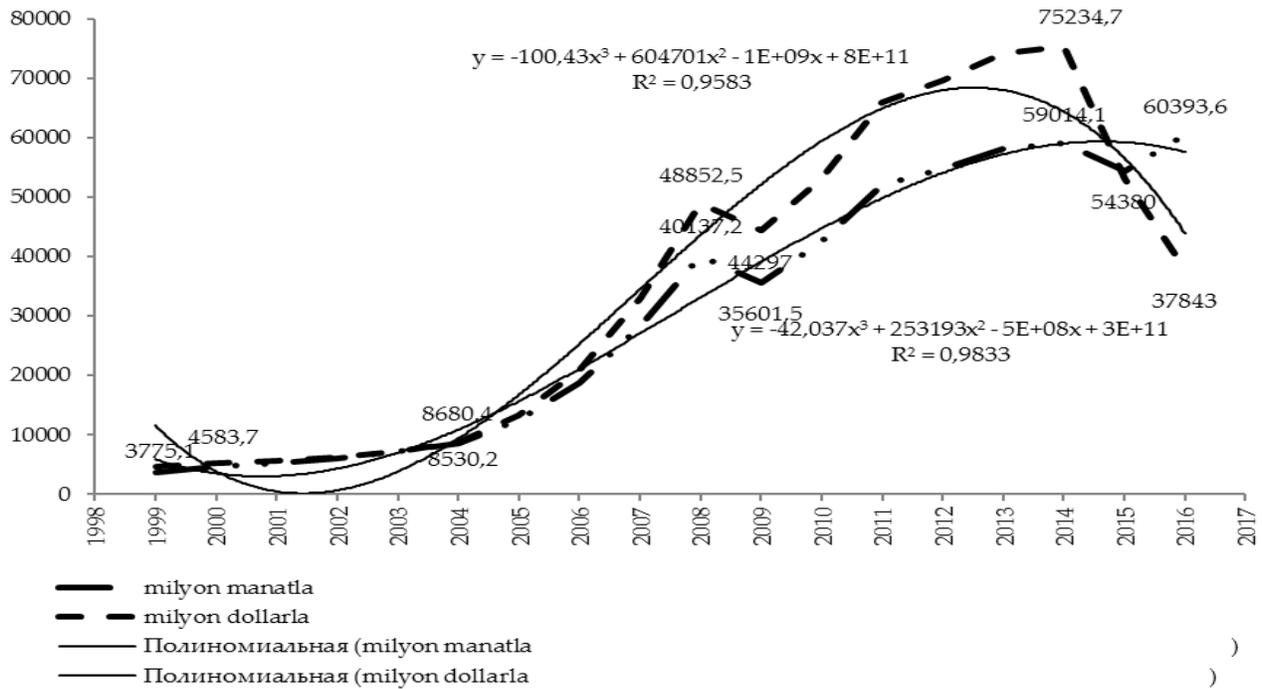


Fig.1. Dynamics of gross domestic product, in manats and dollars

As far as we know GDP increased by 5.1% in 2012 compared to previous, 6.2% in 2013 compared to previous, 1.4 % in 2014 compared to previous, decreased by 7.9 % in 2015 compared to previous and increased by 11.1% in 2016 compared to previous.

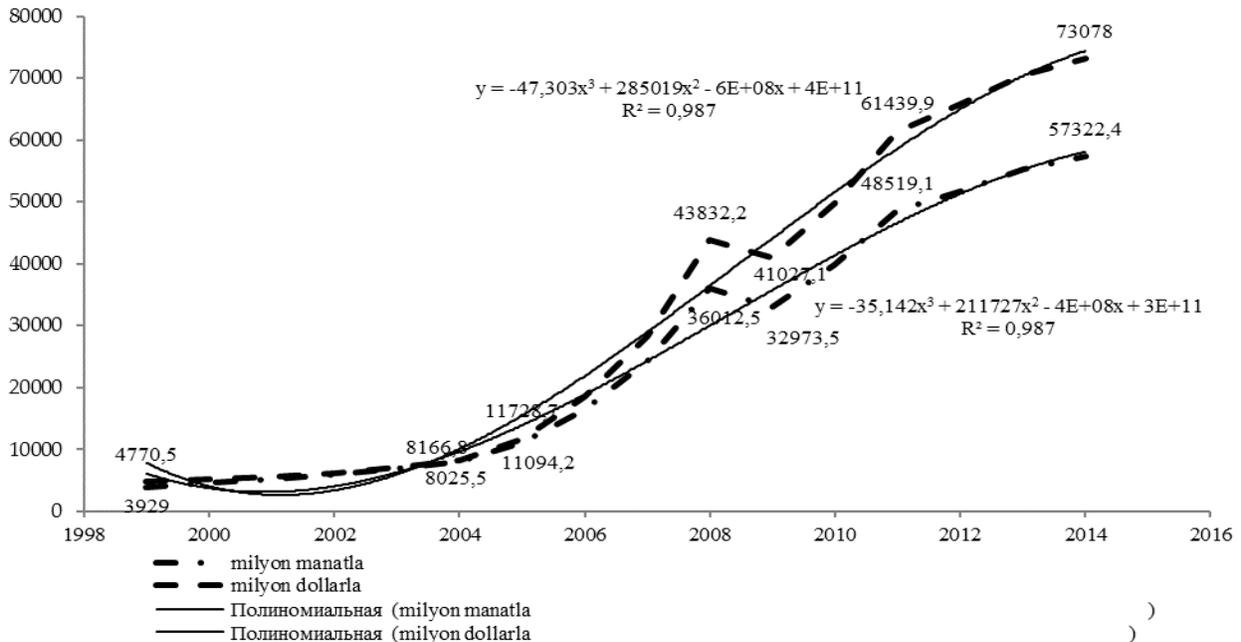


Fig.2. Dynamics of gross domestic income, in manat and dollars

If we take a look at indicators of gross domestic income last 15 years it is clear that salary of employees reached to 10965.0 million manat in 2015, it was 22.7 times as much as in 1995, 10.7 times as much as in 2000, 3.9 times as much as in 2005, 1.6 times as much as in 2010, 1.0 times as much as in 2014.

However, decrease in rate of exchange of local manat 2 times caused to decrease in amount of salary of employees, production and import taxes, salary of the rest world, the whole composition of gross domestic income except of production of main funds by 1.2–20.1% in 2015 (Fig.2).

Let’s have a look at the economic operation account of the rest world. As this operation is related to oil export and world price of oil the maximal indicator of the study 2011 was recorded. Export of goods and service in foreign trade account of goods and service reached to 29388.3 million manat in 2011, it was 42.3 times as much as in 1995, 15.5 times as much as in 2000, 3.7 times as much as in 2005, 1.2 times as much as in 2010, but decreased by 2.5% in 2012, 5.1% in 2013, 13.2% in 2014, 30.01% compared to 2015, foreign trade balance reached to 16846.4 million manat in 2011 (in 1995 import was 446.5 million manat more than export), it was 199.1 times as much as in 2000, 13.3 times as much as in 2005, 1.17 times as much as in 2010, however, decreased by 11.1% in 2012, 23.5% in 2013, 40.3% in 2014, 90.03% in 2015 compared to 2011. The reason for decrease in the balance was the increase in the import of goods and service in a row.

Analyzing the socio – economic situation in the country, it is obvious that the trend towards GDP growth slowed down the rapid growth in 2011. But actual final consumer spending continued to grow in the aggregate. Almost 61.2% of actual final consumption expenditure and gross crop in 2012 increased by 12.3% compared to 2011 due to GDP and net exports growth of 38.8%, and in 2013, 60.3% of the growth rate of 14.4% compared to 19.9% in 2014 due to GDP growth and 39.7% of net exports, compared with 9.2% in 2014, GDP growth was 80.1%, and net exports decreased by 6.6% in 2015 to 100.0% of net exports. Considering the dynamics of GDP growth, it can be argued that the decline in GDP since 1987 slowed in 1995–1996. The 1987–1989 level was at the level of 2005–2006 with the level of 1990–1991. In 2005, the level of 1992 reached its level in 2003, from 1993 to 2001, to the level of 1994, and since 1998 this growth has been sustainable (Table 1).

Table 1. Dynamics of gross domestic product

	1995	1998	2001	2003	2005	2006
1987					100	100
1988					100	100
1989					100	100
1990					100	
1991					100	
1992				100		
1993			100			
1994		100				
1995	100					

Deposits of the population also continued to grow during the period of economic development. But for some reason, this growth has been observed in recent years with fluctuations. Thus, in 2014 compared to 2013, 32.5% of growth was 12.5% in foreign currency and 67.5% in national currency. In 2015, an increase of 31.7% compared with 2014 was due to an increase in deposits in foreign currency. 56.7% growth in 2.9 times in foreign currency offset the decline in savings in the national currency, and 43.3% led to an increase in overall economy of the population. The decrease of 21.7% in 2016 compared to 2015 was due to a decrease in savings in foreign currency. A significant increase in deposits in national currency allowed covering 4.7% of deposits in foreign currency. The above – mentioned price remains for oil, as our economy is oriented to export of raw materials, and manat is directly connected with the psychological factor.

Investments from all sources (including foreign investments) in 2009 amounted to 21.5% in national currency, 19.7% in US dollars, 21.9% of foreign investments in manat, 20.2% in US dollars, 21.1% %, a decrease of 19.5% in US dollars, 8.5% in national currency in 2015, 30.0% in US dollars, an increase in foreign investment by 19.9% in US dollars, 8.5% in dollars, domestic investment decline of 29.8% and a decrease in the dollar rate by 45.5% is due to a sharp drop in oil prices by 2–3 times. The increase in manat in 2016 and in 2015 may be due to a change in the exchange rate.

Credit investments into the economy also rapidly increased by 2015. Thus, reaching to 21730.4 million manat in 2015, it increased by 46.6 times, 15.1 times in 2005, 2.3 times in 2010, reaching to 5279.3 million manat in 2000 short – term credits increased by 15.7 times in 2000, 5.8 times in 2005, 2.1 times in 2010, and reaching to 16433 in 2015 long – term credits increased by 126.5 times in 2000, 31.1 times in 2005, 2.5 times in 2010. However, the decrease in 2016 occurred. Credit investments decreased by 25.5%, short – term credit by 35.5%, long – term credit by 21.1%. 25.5 decrease in gross credit investment is due to decrease in short – term credits 65.5% and long – term credits 34.5%.

Table 2. Major capital investments in the oil and non – oil sector

	Gross		including:					
			Oil sector			Non – oil sector		
	thousand manat	Net weigh, in percent	thousand manat	Compared to previous year, in percent	Net weigh, in percent	thousand manat	Compared to previous year, in percent	Net weigh, in percent
2000	967821.1	100.0	501907.9	100.0	51.9	465913.2	100.0	48.1
2001	1170820.3	100.0	686551.4	136.8	58.7	484268.9	103.9	41.3
2002	2106976.7	100.0	1448392.4	210.0	68.8	658584.3	136.0	31.2
2003	3786366.7	100.0	2771092.1	191.3	73.2	1015274.6	154.2	26.8
2004	4922755.9	100.0	3708138.4	133.8	75.3	1214617.5	119.6	24.7
2005	5769876.3	100.0	3756167.6	101.3	65.2	2013708.7	165.8	34.8
2006	6234483.7	100.0	3408512.5	90.7	54.7	2825971.2	140.3	45.3
2007	7471189.9	100.0	3529865.3	103.6	47.2	3941324.6	139.5	52.8
2008	9944153.8	100.0	2922414.7	82.0	29.4	7021739.1	176.4	70.6
2009	7724944.8	100.0	2058349.8	74.0	26.6	5666595.0	84.8	73.4
2010	9905665.8	100.0	2958491.7	135.9	29.9	6947174.1	115.9	70.1
2011	12799061.3	100.0	3070236.0	102.2	24.0	9728825.3	138.0	76.0
2012	15407274.4	100.0	3854477.8	123.6	25.0	11552796.6	116.9	75.0
2013	17850815.7	100.0	5094617.8	131.3	28.5	12756197.9	109.7	71.5
2014	17618601.1	100.0	5959403.1	116.5	33.8	11659198.0	91.0	66.2
2015	15957028.2	100.0	7137136.8	117.5	44.7	8819891.4	74.2	55.3

Gross foreign investments in 2016 increased by 10,9 times compared to 2000, by 2.1 times compared to 2005, by 2.1 times compared to 2010, financial credits in 2016 increased by 8.3 times compared to 2000, by 3.1 times compared to 2005, decreased by 35.5% compared to 2010, investment to oil industry in 2016 increased by 10,3 times compared to 2000, by 1.5 times compared to 2005, 1.9 times compared to 2010, investment to invested joint and foreign enterprises in 2016 increased by 14.5 times compared to 2000, 7.5 times compared to 2005, 2.9% times compared to 2010, other investments increased by 3.9 times compared to 2005 and decreased by 49.8% compared to 2010. But since 2012, these investments began to decline.

Despite the foregoing, it can be said that the experience of developed foreign countries proves that only market principles for regulating socio – economic processes can not guarantee a high level of prosperity for all its participants. As it turns out, the income of various groups of the population in market systems depends on their production factors, their availability, supply and demand for these factors. This is a fair market regulation.

However, in terms of social justice, the crisis of the market system of social and economic regulation was hidden here.

3.2. Econometric analysis

Table 3. Econometric models

	const	Oil production	Oil price	R ²	F	P – (F)	DW
CPI	87.1000***	0.091453	0.088111	0.271259	F(2. 14)	2.605612	1.068926
	(9.256)	(1.095)	(1.663)		2.605612		
CPI	95.3948***		0.102683*	0.208792	F(1. 15)	0.065192	0.065192
	(16.969)		(1.990)		3.958342		
Initial Income	64.9131***	0.205753*	0.205753*	0.417973	F(2. 14)	0.022626	1.055547
	(3.693)	(1.795)	(2.079)		5.026923		
GDP– manat	0.450192	0.458485***	0.637411***	0.827483	F(2. 14)	4.55e – 06	1.531993
	(0.029)	(5.322)	(4.695)		33.57580		
GDP – dollar	-45.3233**	0.825662***	0.676960***	0.852302	F(2. 14)	1.53e – 06	1.158197
	(-2.326)	(4.776)	(6.171)		40.39411		
GDP – euro	-29.9933	0.492114***	0.847824***	0.801909	F(2. 14)	0.000012	1.273352
	(-1.509)	(4.399)	(4.809)		28.33738		
GDP Per Person – manat	1.04739	0.625909***	0.451904***	0.830243	F(2. 14)	4.06e – 06	1.536565
	(0.070)	(4.731)	(5.383)		34.23549		
GDP Per Person – dollar	-44.1788**	0.811864***	0.667779***	0.853646	F(2. 14)	1.44e – 06	1.44e – 06
	(-2.314)	(4.792)	(6.212)		40.82931		
GDP Per Person – Euro	-29.0593	0.833912***	0.485200***	0.803803	F(2. 14)	0.000011	1.273989
	(-1.494)	(4.832)	(4.431)		28.67842		
1\$= manat	151.107***	-0.158234	-0.280494*	0.287158	F(2. 14)	2.819854	0.868080
	(6.095)	(-0.719)	(-2.011)		2.819854		
1\$= manat	136.755***		-0.305707**	0.260804	F(1. 15)	0.036189	0.952086
	(9.445)		(-2.301)		5.292331		
1euro= manat	134.601***	-0.204283	-0.0683822	0.078906	F(2. 14)	0.562508	1.038975
	(4.988)	(-0.853)	(-0.451)		0.599657		
1euro= manat	130.262***	-0.231351		0.065572	F(1. 15)	0.321169	0.921756
	(5.311)	(-1.026)			1.052609		
1euro= manat	116.072***		-0.100933***	0.031004	F(1. 15)	0.499038	1.141232
	(7.312)		(-0.6928)		0.479934		
GNI – manat	9.34766	0.548435***	0.457368***	0.772716	F(2. 13)	0.000066	1.554170
	(0.529)	(3.583)	(4.629)		22.09863		
GNI – dollar	-22.3066	0.690792***	0.608516***	0.808995	F(2. 13)	0.000021	1.286427
	(-1.082)	(3.867)	(5.278)		27.53051		
GNI – euro	-6.24940	0.712763***	0.418564***	0.750158	F(2. 13)	0.000122	1.388989
	(-0.308)	(4.059)	(3.693)		19.51643		
GNI Per Person – manat	9.86068	0.537954***	0.450640***	0.775964	F(2. 13)	0.000060	1.564009
	(0.573)	(3.607)	(4.681)		22.51317		
GNI Per Person – dollar	-21.4052	0.678497***	0.599980***	0.811422	F(2. 13)	0.000020	1.291411
	(-1.063)	(3.889)	(5.327)		27.96852		
GNI Per Person – euro	-5.56714	0.700429***	0.412317***	0.753667	F(2. 13)	0.000111	1.404250
	(-0.282)	(4.093)	(3.733)		19.88709		
Funds	91.2378***	0.0897165	0.111723***	0.515071	F(2. 14)	0.006306	1.964528
	(13.949)	(1.545)	(3.032)		7.435106		
Funds	99.3752**		0.126019*	0.432408	F(1. 15)	0.004120	1.881101
	(24.47)		(3.380)		11.42745		
Investments	111.998**	-0.471343**	0.561874	0.299214	F(2. 14)	0.083004	1.032906
	(2.634)	(-1.250)	(2.348)		2.988782		
Investments	69.2464**		0.486770*	0.221043	F(1. 15)		
	(2.694)		(2.063)		4.256510	0.056855	0.977720

Note: 1.(t – stat); 2. * p<0.05; ** p<0.01; *** p<0.001.

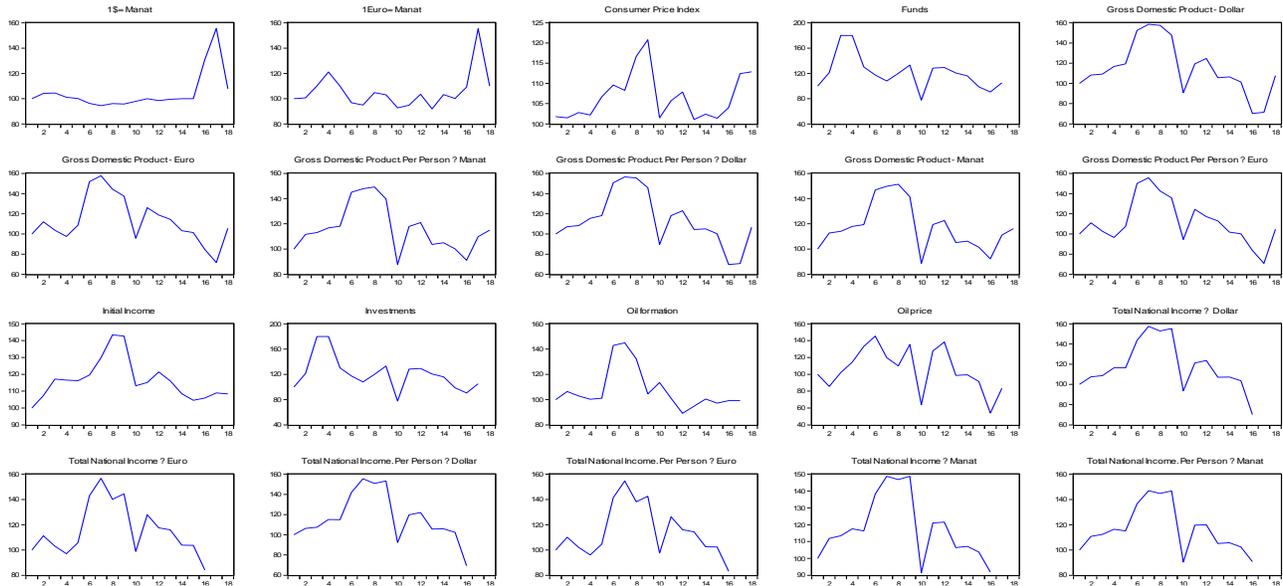


Fig.3. Index of macroeconomical indicators (compared to previous year)

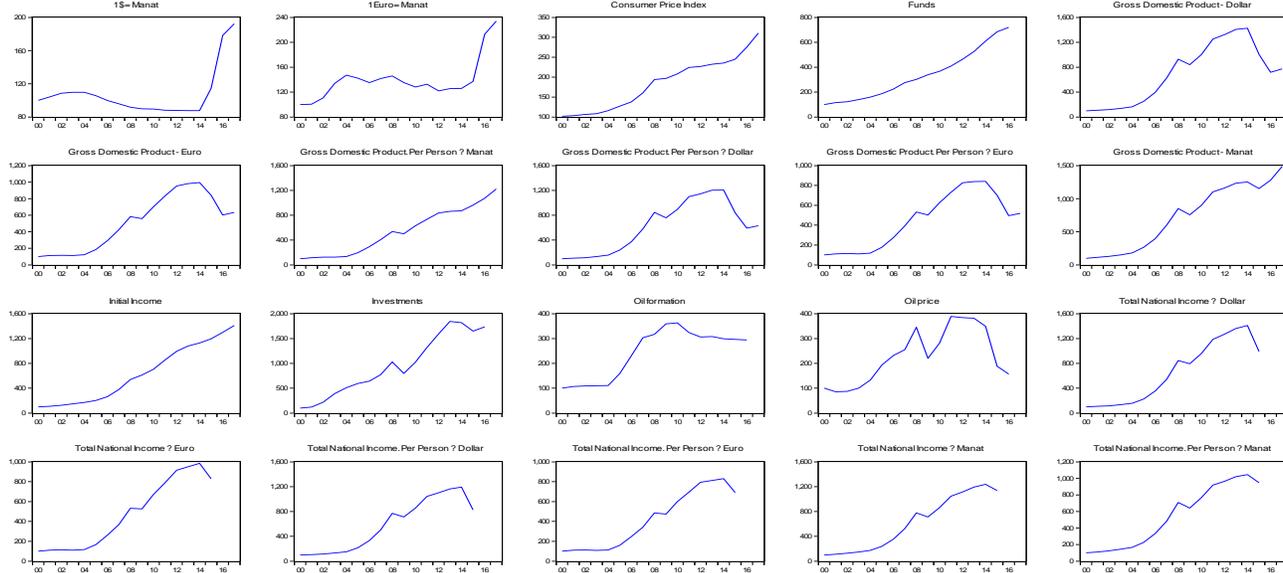


Fig. 4. Index of macroeconomical indicators (compared to base year 2000=100)

Let's look through econometric model established in order to determine dependence of main macroeconomic indicators on oil formation and oil price (Fig.3.). Compared with previous years, models show that the model has economic sense and is statistically significant, which reflects the dependence of gross domestic product on oil and gas prices, oil prices and oil production. These models also fluctuated $0.80191 < R^2 < 0.85230$. Coefficients $p < 0.05$; $p < 0.01$; $p < 0.001$. It can be attributed only to the level of GDP per capita, either in dollars or in euros. Thus, here also $0.80383 < R^2 < 0.85366$ and the coefficients $p < 0.05$; $p < 0.01$; $p < 0.001$. Then the models of dependence on gross national income, both in manats, and in dollars and euros, depend on oil prices and oil production. It is true that R^2 is slightly lower and $0.750158 < R^2 < 0.808995$. However, there were statistically significant indicators of oil and

oil production. $p < 0.05$; $p < 0.01$; $p < 0.001$. Such a case can be attributed to the models of the price of oil and oil dependence of the gross national income, both in manats, in dollars and in euros per capita. These models also have economic and statistical significance. These models are slightly lower than the gross domestic product R^2 , which ranges from $0.75367 < R^2 < 0.81142$. In these models, the coefficients of oil and oil production are statistically significant $p < 0.05$; $p < 0.01$; $p < 0.001$. In the primary population income model is $p < 0.05$; $p < 0.01$; $p < 0.001$ and $R^2 = 0.417973$. There is no doubt about the economic significance and statistical significance of the CPI, neither key assets, nor investment models for oil prices, and dependence on oil production. In these models are responded $p < 0.05$; $p < 0.01$ $p < 0.001$ in separately. From this point of view, a less important factor was removed from the model. Here R^2 is very low. Thus, the models indicated the dependence of oils and oil prices on fixed assets were $0.43241 < R^2 < 0.51507$. It is slightly more difficult to look at oil prices and oil dependence models. Here, $p < 0.001$ condition is not satisfied at all, $p < 0.05$ and $p < 0.01$ are satisfied individually. From this point of view, a less important factor was removed from the model. Here R^2 is very low. Thus, the models for the dependence of prices on oil and base oils were $0.22211 < R^2 < 0.29921$. CPI depends on oil prices and $p < 0.001$ for fixed quantities. The condition $p < 0.01$ is not satisfied in full. $p < 0.05$ is satisfied once. In these models, R^2 is very small ($0.20879 < R^2 < 0.22712$). US dollar and euro exchange rates in US dollars are based on oil prices and oil production dependence models at $p < 0.001$ for a fixed amount, but only once in the price of oil. The condition $p < 0.01$ is separated. Although the dependence models at the exchange rate of the dollar are $0.26081 < R^2 < 0.22815$, the exchange rate of the manat for the euro cannot be related to oil prices and dependence on oil production (Table 3). But this is not so. Like all macroeconomic indicators, the manat exchange rate for both the dollar and the euro depends on oil prices and oil production (perhaps even more). Simply, the Central Bank for a long time maintained a stable exchange rate (with intervention) in the foreign exchange market and did not allow its natural fluctuations.

Table 4. Econometric models

	const	Oil production	Oil price	R^2	F	P – (F)	DW
CPI	54.2635	0.503687**	0.003379***	0.733257	F(2. 14)	0.000096	0.321708
	(2.544)	(3.820)	(0.028)		19.24246		
CPI	54.3283**	0.506622***		0.733241	F(1. 15)	0.000012	0.325824
	(2.651)	(6.421)			41.23062		
CPI	93.9612***		0.360844***	0.455238	F(1. 15)	0.002967	0.324536
	(3.653)		(3.540)		12.53495		
Initial Income	-215.168	3.13447**	0.187865	0.579048	F(2. 14)	0.002342	0.171695
	(-1.095)	(2.582)	(0.1712)		9.628989		
Initial Income	31.8735		2.41239***	0.378671	F(1. 15)	0.008553	0.249111
	(0.1583)		(3.024)		9.141782		
Initial Income	-211.568	3.29764***		0.578167	F(1. 15)	0.000395	0.185893
	(-1.120)	(4.534)			20.55913		
GDP– manat	-300.037*	3.20807	0.923614***	0.762184	F(2. 14)	0.000043	0.217255
	(-1.895)	(3.278)	(1.044)		22.43457		
GDP – manat	-47.1958		3.20037***	0.579630	F(1. 15)	0.000385	0.279188
	(-0.2658)		(4.548)		20.68286		
GDP – dollar	-387.070***	2.03706**	2.58616***	0.875995	F(2. 14)	4.51e – 07	0.300526
	(-3.179)	(2.707)	(3.802)		49.44934		
GDP – euro	-224.647*	1.62956**	1.45817**	0.804074	F(2. 14)	0.000011	0.280384
	(-2.128)	(2.497)	(2.472)		28.72775		
GDP. Per Person – manat	-162.168	2.60868**	0.149399	0.644596	F(2. 14)	0.000716	0.219318
	(-1.142)	(2.971)	(0.188)				
GDP Per Person – manat	-159.306	2.73844***		0.643697	F(1. 15)	0.000107	0.240612
	(-1.166)	(5.206)			27.09897		
GDP Per Person – manat	43.4333		2.00077***	0.420523	F(1. 15)	0.004866	0.272945
	(0.2838)		(3.299)		10.88539		
GDP Per Person – dollar	-319.654***	1.72431***	2.25587***	0.903144	F(2. 14)	8.00e – 08	0.346882
	(-3.500)	(3.055)	(4.421)		65.27235		

GDP Per Person – euro	-179.106**	1.35766**	1.28188**	0.837073	F(2. 14)	3.05e – 06	0.318880
	(-2.218)	(2.719)	(2.840)		35.96395		
1\$= manat	115.992***	0.116276	-0.179910**	0.362403	F(2. 14)	0.042837	1.103503
	(9.666)	(1.568)	(-2.683)		3.978730		
1\$= manat	125.156***		-0.0973893**	0.250487	F(1. 15)	0.040741	0.758334
	(11.40)		(-2.239)		5.012998		
1\$= manat	112.545***	-0.0399842		0.034500	F(1. 15)	0.475382	0.677388
	(7.935)	(-0.0399842)			0.535994		
1euro= manat	116.523***	0.191266*	-0.125600	0.230495	F(2. 14)	0.159765	1.151248
	(7.677)	(2.039)	(-1.481)		2.096752		
1euro= manat	114.117***	0.0821770		0.109935	F(1. 15)	0.193570	0.844181
	(7.278)	(1.361)			1.852693		
1euro= manat	131.598***		9.024	0.002049	F(1. 15)	0.863039	0.732499
	(9.024)		(0.1755)		0.030798		
GNI– manat	-290.006*	1.95956*	1.89195**	0.804881	F(2. 13)	0.000024	0.218510
	(-2.124)	(2.087)	(2.220)				
GNI – dollar	-368.914**	1.67995*	2.70574***	0.849483	F(2. 13)	4.51e – 06	0.252552
	(-2.732)	(1.810)	(3.210)		36.68444		
GNI – euro	-213.863*	1.27320	1.64701**	0.778206	F(2. 13)	0.000056	0.231568
	(-1.889)	(1.636)	(2.331)		22.80646		
GNI – euro	-133.994		2.60310***	0.732545	F(2. 13)	0.000023	0.552521
	(-1.240)		(6.192)		38.34517		
GNI – euro	-186.766	2.77334***		0.685526	F(1. 14)	0.000075	0.333312
	(-1.445)	(5.524)			30.51884		
GNI Per Person – manat	-233.325**	1.70445**	1.60006**	0.836653	F(2. 13)	7.68e – 06	0.227865
	(-2.221)	(2.360)	(2.440)		33.29268		
GNI Per Person – dollar	-303.657**	1.48977*	2.28671***	0.875268	F(2. 13)	1.33e – 06	0.262250
	(-2.917)	(2.082)	(3.519)		45.61154		
GNI Per Person – euro	-169.699*	1.10746*	1.38988**	0.806937	F(2. 13)	0.000023	0.237129
	(-1.915)	(1.818)	(2.513)		27.16769		
Funds	-10.2660	1.64310**	-0.207976	0.523013	F(2. 14)	0.005618	0.175287
	(-0.105)	(2.714)	(-0.380)		7.675438		
Funds	-14.2506	1.46246***		0.518094	F(1. 15)	0.001123	0.150809
	(-14.2506)	(4.016)			16.12638		
Funds	119.234		0.958125	0.272147	F(1. 15)	0.031732	0.234996
	(1.168)		(2.368)		5.608564		
Investments	-201.559	3.01110*	1.86882	0.621462	F(2. 14)	0.001114	0.190778
	(-0.7695)	(1.860)	(1.277)		11.49219		
Investments	-165.754	4.63425***		0.577383	F(1. 15)	0.000401	0.359331
	(-0.6235)	(4.527)			20.49312		
Investments	35.7590		4.00579***	0.527958	F(1. 15)	0.000954	0.213196
	(0.1449)		(4.096)		16.77684		

Note: 1.(t – stat); 2. *p<0.05; **p<0.01; ***p<0.001;

The base year 2000 was adopted, and the main macroeconomic indicators, oil production and oil prices dependence for determining established econometric models (Fig. 4.). It is clear that the gross domestic product in currency, dollar and euro and oil price growth and oil production in reflects the model's interdependence with some variables have a certain economic meaning and are statistically significant. In these models fluctuated $0.579630 < R^2 < 0.875995$. The sums were calculated for individual models at $p < 0.05$; $p < 0.01$; $p < 0.001$. This is especially noticeable in the models of the dollar and euro. It can be attributed only to the level of GDP per capita, either in dollars or in euros. Thus, here also $0.42052 < R^2 < 0.90314$ and the coefficients $p < 0.05$; $p < 0.01$; conditions $p < 0.001$ are satisfied individually, and the strongest dependence is observed in the dollar model (Table 4).

Then the models of dependence on gross national income, both in manats, and in dollars and euros, depend on oil prices and oil production. It is true that the R^2 limit for these models is somewhat lower, but the upper limit is

somewhat lower and is $0.68553 < R^2 < 0.84948$. However, there were statistically significant indicators of oil and oil production. $p < 0.05$; $p < 0.01$; conditions $p < 0.001$ are satisfied on both models on some models and on some models separately. Such a case can be attributed to the models of the price of oil and oil dependence of the gross national income, both in manats, in dollars and in euros per capita. These models also have significant and statistical significance. The upper limit of R^2 for these models is slightly higher than the growth model for gross domestic product and is $0.806937 < R^2 < 0.875268$. In these models, the coefficients of oil and oil production are statistically significant $p < 0.05$; $p < 0.01$; $p < 0.001$. On the models of dependence of CPI oil prices and oil production $p < 0.05$; $p < 0.01$ $p < 0.001$ and $0.45552 < R^2 < 0.73326$. For population incomes, $p < 0.05$; $p < 0.01$; conditions $p < 0.001$ were satisfied on both models on some models and on some models separately and amounted to $0.37867 < R^2 < 0.57905$. The models of dependence on the basic prices for oil and natural gas and oil prices also have economic meaning and statistical significance. Thus, in the models of the main fund, $p < 0.05$; the terms $p < 0.01$ $p < 0.001$ are satisfied separately. On this point less, significant factor was removed from the model. R^2 is rather low here. Thus, in the model on dependence of main funds on oil price and oil production was nearly $0.27215 < R^2 < 0.52301$. It is observed a bit better situation in the model on dependence of volume of investment on oil price and oil production. Here $p < 0.05$; $p < 0.01$; and $p < 0.001$ conditions were satisfied separately. On this point, less significant model was removed from the factor. R^2 is rather in normal level. It was between $0.523013 < R^2 < 0.621462$. In the model on dependence of dollar rate and euro rate to manat on oil price and oil production $p < 0.001$ condition is responded to constant quantity. $p < 0.05$ and $p < 0.01$ are satisfied separately. In the model on dependence of manat rate to dollar is $0.03450 < R^2 < 0.362403$, to euro is $0.00205 < R^2 < 0.23049$ (Table 4). Consequently, these models also show that the manat does not depend on the dollar and the euro's exchange rate on oil prices and dependence on oil production. In fact, as we have already seen, this is not so. Like all macroeconomic indicators, the manat exchange rate for both the dollar and the euro depends on oil prices and oil production (perhaps even more). Simply, the Central Bank for a long time maintained a stable exchange rate (with intervention) in the foreign exchange market and did not allow its natural fluctuations.

Table 5. Comparative to the previous year

	const	Consumer Price Index	1\$= manat	Oil production	Oil price	R ²	F	P – (F)	DW
Initial Income	-47.5030	1.6575***	-0.237386*	0.07987	0.04348	0.777502	F(4, 12)	0.000687	1.411902
	(-1.512)	(4.394)	(-1.805)	(0.684)	(0.569)		10.48325		
GDP– Manat	-105.595***	1.13132***	0.05577	0.54534***	0.36262***	0.923659	F(4, 12)	1.29e – 06	1.742967
	(-3.589)	(3.202)	(0.4528)	(4.988)	(5.070)		36.29756		
GDP – dolaar	-72.6404	1.10451*	-0.511778**	0.620103***	0.544644***	0.916310	F(4, 12)	2.23e – 06	1.556988
	(-1.713)	(2.170)	(-2.883)	(3.936)	(5.284)		32.84644		
GDP Per Person – manat	-101.969***	1.08882***	0.0607734	0.538748***	0.360123***	0.924411	F(4, 12)	1.22e – 06	1.719496
	(-3.545)	(3.153)	(0.505)	(5.041)	(5.151)		36.68820		
GDP Per Person – Dollar	-69.3647	1.06253*	-0.500449**	0.612458***	0.539937***	0.916307	F(4, 12)	2.23e – 06	1.534090
	(-1.662)	(2.120)	(-2.864)	(3.949)	(5.322)		32.84523		
GNI – manat	-129.538***	1.49903***	0.124326	0.411032***	0.292460***	0.906896	F(4, 11)	0.000013	2.197112
	(-3.116)	(3.851)	(0.517)	(3.417)	(3.642)		26.78688		
GNI – dollar	-132.305**	1.56792**	-0.179092	0.503294**	0.446029***	0.894021	F(4, 11)	0.000026	1.902860
	(-2.343)	(2.966)	(-0.548)	(3.081)	(4.089)		23.19862		
GNI Per Person – manat	-126.124***	1.45418***	0.131599	0.406219***	0.290310***	0.907858	F(4, 11)	0.000012	2.191801
	(-3.107)	(3.826)	(0.561)	(3.459)	(3.702)		27.09518		
GNI Per Person – dollar	-128.822**	1.52166**	-0.167989	0.497355**	0.442098***	0.894228	F(4, 11)	0.000025	1.887957
	(-2.323)	(2.930)	(-0.523)	(3.100)	(4.127)		23.24943		
Funds	131.547***	-0.461149**	-0.001065	0.131672**	0.152283 ***	0.729490	F(4, 12)	0.002107	2.676491
	(9.309)	(-2.718)	(-0.018)	(2.508)	(4.433)		8.090152		
Investments	158.301	-1.54914	0.658443	-0.195161	0.743396**	0.410142	F(4, 12)	0.145770	1.236891
	(1.404)	(-1.145)	(1.395)	(-0.466)	(2.713)		2.085967		

Note: 1. (t – stat); 2. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Now let's look at the macroeconomic indicators of the past year, the consumer price index, the US dollar rate, the price of oil and dependence on oil production. In the model of population dependencies, only CPI ($p < 0.001$) and \$ 1/pounds ($p < 0.05$) were statistically significant, and $R^2 = 0.777502$. The gross domestic product – only 1 US dollar/manat in the manat model is statistically insignificant, and the other three factors are statistically significant ($p < 0.001$) and $R^2 = 0.777502$. The group of the domestic product is the consumer price index in the dollar model ($p < 0.05$) ($p < 0.01$), the price of oil ($p < 0.001$) and oil production ($p < 0.001$) are statistically significant, and $R^2 = 0.91631$. The gross domestic product – \$ per man for manat – is statistically unimportant and statistically significant ($p < 0.001$) and $R^2 = 0.92441$. Gross domestic product – dollar CPI ($p < 0,05$) and other remaining factors are statistically significant ($p < 0.001$) and $R^2 = 0.916307$. The gross national income – \$1/manat in the manat model is statistically insignificant, other factors are statistically significant ($p < 0.001$) and $R^2 = 0.90689$. Gross national income – \$1/manat in the dollar model is statistically insignificant, the CPI and oil production ($p < 0.05$) and the oil price ($p < 0.001$) are statistically significant, and $R^2 = 0.889402$. \$1/manat for gross national income per person is statistically insignificant, other factors are statistically significant ($p < 0.001$) and $R^2 = 0.90786$. The gross national income per person – US \$1/manat in the dollar model is statistically insignificant, other remaining factors are statistically significant ($p < 0.01$) and $R^2 = 0.90786$. In the basic fund model, 1 dollar/manat is statistically insignificant, the price of oil ($p < 0.001$) and other remaining factors are statistically significant ($p < 0.05$) and $R^2 = 0.72949$. However, in the investment model, the price of oil ($p < 0.01$) is statistically significant, and the remaining factors are statistically insignificant and $R^2 = 0.41014$ (Table 5).

Table 6. Comparative to the base year

	const	Consumer Price Index	1\$= manat	Oil production	Oil price	R ²	F	P – (F)	DW
Initial Income	-515.948***	9.69261***	-1.93244***	-1.37796***	-0.087602	0.992180	F(4. 12)	1.59e – 12	1.590599
	(-7.736)	(23.56)	(-3.343)	(-5.388)	(-0.4938)		380.63		
GDP – Manat	-589.271***	7.71646***	-1.11127**	-0.466062**	0.757964***	0.997031	F(4. 12)	4.78e – 15	1.561538
	(-13.37)	(28.39)	(-2.909)	(-2.758)	(6.466)		1007.385		
GDP – dolaar	-140.727	6.09753***	-4.95366***	-0.0867180	1.94338***	0.987365	F(4. 12)	2.82e – 11	1.479640
	(-1.454)	(10.21)	(-5.903)	(-0.2336)	(7.546)		234.434		
GDP Per Person – Manat	-434.659***	6.84571***	-0.849454*	-0.676938***	0.019575	0.991728	F(4. 12)	2.23e – 12	1.606077
	(-8.051)	(20.56)	(-1.815)	(-3.270)	(0.1363)		359.6716		
GDP Per Person – Dollar	-98.5821	4.49488***	-3.99044***	0.223534	1.73948***	0.988659	F(4. 12)	1.48e – 11	1.420330
	(-1.266)	(9.362)	(-5.914)	(0.7488)	(8.399)		261.5154		
GNI – manat	-562.252***	8.23475***	-1.44718**	-0.746694***	0.605155***	0.996329	F(4. 11)	2.62e – 13	1.811459
	(-7.136)	(23.02)	(-2.383)	(-3.895)	(4.357)		746.4331		
GNI – dollar	-339.455*	7.39100***	-3.66295**	-0.620078	1.55281***	0.987608	F(4. 11)	2.09e – 10	1.980804
	(-2.082)	(9.989)	(-2.915)	(-1.563)	(5.404)		219.1612		
GNI Per Person – manat	-441.752***	6.34234***	-1.12544**	-0.379296**	0.608989***	0.997334	F(4. 11)	4.51e – 14	1.821887
	(-7.823)	(24.74)	(-2.586)	(-2.761)	(6.118)		1028.787		
GNI Per Person – dollar	-252.466*	5.61047***	-3.02943**	-0.242597	1.41175***	0.988590	F(4. 11)	1.33e – 10	1.843876
	(-1.906)	(9.331)	(-2.967)	(-0.7527)	(6.046)		238.2718		
Funds	-216.841***	4.52272***	-0.333358	-0.571175**	-0.265129	0.963964	F(4. 12)	1.49e – 08	1.032966
	(-3.233)	(10.93)	(-0.5734)	(-2.221)	(-1.486)		80.25022		
Investments	-875.857***	11.5090***	0.427209	-2.86754***	1.88358***	0.962509	F(4. 12)	1.88e – 08	1.295014
	(-4.265)	(9.087)	(0.2400)	(-3.641)	(3.448)		77.01888		

Note: 1.(t – stat); 2. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Considering the base year 2000, let's look at the latest models, macroeconomic indicators in comparison with this, the consumer price index, the US dollar rate, oil prices and dependence on oil production. In the population dependence model, only statistical indicators are statistically significant for all factors: CPI, US dollar exchange rate, oil prices and oil production ($p < 0.001$), and $R^2 = 0.992180$. Gross domestic product is statistically significant, only 1 US dollar ($p < 0.01$) and the remaining three factors ($p < 0.001$) in GDP and $R^2 = 0.99703$. Gross domestic product – but dollar oil production is statistically unimportant, the other three factors ($p < 0.001$) are statistically

significant and $R^2=0.93737$. Gross domestic product – price per person – the price of oil was statistically insignificant, provided $p<0.05$ and other factors ($p<0.001$) and $R^2=0.99172$. In gross domestic product, oil production is statistically unimportant, and the remaining factors are statistically significant ($p<0.001$) and $R^2=0.98865$. Gross national income was statistically significant with the condition \$ 1/pound ($p<0.01$) and other factors ($p<0.001$) and $R^2=0.99632$. Gross national income – dollar oil production was statistically insignificant, provided $p<0.01$ the remaining statistical indicators were statistically significant ($p<0.001$) and $R^2=0.97606$. The gross national income per capita was US \$1/manat, and oil production was statistically significant ($p<0.001$) and $R^2=0.99733$. Gross national income per dollar oil production is statistically unimportant, from \$1/barrel ($p<0.01$) and other factors ($p<0.001$) and $R^2=0.98859$. it is statistically significant with the condition for oil production ($p<0.01$), CPI factor ($p<0.001$) and $R^2=0.96396$. In the investment model, \$ 1/manat is statistically insignificant, while the other statistical values are statistically significant ($p<0.001$) and $R^2=0.96251$ (Table 6).

4. Conclusions

It is well known that from the economic and ecological analysis it is clear that at high oil production levels and high oil prices, economic growth and economic growth have reached the highest level. At that time, the exchange rate of the manat was relatively stable (approximately for 10 years it remained at the level of 1 dollar = 0.8 manat). This also created some difficulties in the study. Despite the fact that the exchange rate is a key factor, it was chosen because of its statistical significance in models that affect the dynamics of a number of macroeconomic indicators. Naturally, if there were no hard, and not strict, measures to maintain the exchange rate of manat in the state, and manat moves in a slightly free and regulated mode of navigation, then as a result of the fall in oil prices in 2014–2015, and the indicators obtained as a result of the analysis will be important in future forecasts. The final conclusion is that macroeconomic indicators and the world market are subject to this law, because in the law of demand there are life and economy, as well as the basic law of microeconomics. In this regard, the use of oil revenues for various sectors of the economy in order to maintain a constant exchange rate, it is necessary to slightly reduce the foreign exchange market and further improve the policy of soft exchange.

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MANAGEMENT CONTROL SYSTEM, CORPORATE SOCIAL RESPONSIBILITY, AND FIRM PERFORMANCE

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Abstract. The aim of this study is to examine, through corporate reputation and double-loop learning, how Management Control System (MCS) in the form of a diagnostic and interactive system positively and significantly affects corporate social responsibility (CSR) and the firm performance (FP). This study uses a sample of 163 respondents who are middle to top level managers of manufacturing companies in Banten Province. We test hypotheses by using structural equation modelling, especially SmartPLS. We find that the effect of MCS on CSR does not directly affect the corporate firm performance, and that reputation and Double-Loop Learning (DLL) do mediate better firm performance. The study implies that MCS can help the company to support the process of CSR application more effectively when it matches performance to the expectation of stakeholders. In addition, manufacturers must maintain their reputation and increase their double-loop learning to seize opportunities as a result of their socially responsible activity, and to achieve optimal corporate firm performance.

Keywords: Management control system (MCS); corporate social responsibility (CSR); reputation (Rep); double-loop learning (DLL); firm performance (FP)

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JEL Classifications: M10

1. Introduction

Management control system (MCS) is a procedure and formal system that uses information to maintain the focus of participants in organizational activities such as planning, monitoring, and reporting (Henri, 2006). MCS can strengthen the resolve of businesspeople to operate socially and responsibly. Moreover, it can monitor whether the business operates in accordance with social responsibility and stakeholder interest (Durden, 2008). Although previous research (Arjalies and Mundy, 2013; Durden, 2008; Kiviverta, 2010) discusses the relation between MCS and corporate social responsibility (CSR), certain aspects have yet to be studied. Durden (2008) and Arjalies and Mundy (2013) use a qualitative method that causes difficulty in generalizing their findings due to the presence of specific organizational characteristics. Therefore, a quantitative study on the causal relation between MCS and CSR is needed so that the results can be generalized. Following up the limitations of the work of Durden (2008) and Arjalies and Mundy (2013), our quantitative approach measures the effect of MCS on CSR and the relationship of CSR to double-loop learning.

Earlier work on organizational education received by each individual in an organization to improve CSR activity discusses the effect of the learning process (Antal and Sobczak, 2005; Blackman et al., 2013), but few consider the opposite direction where CSR affects the learning process. Carter (2005) analyzes the role of organizational learning in mediating the relation between CSR and supplier performance but does not show clearly how CSR can affect organizational learning and what the mechanism of learning is. We use a new double-loop learning approach that is not found in previous discussions of CSR. According to Argyris (1976), double-loop learning is a process whereby an entity (an individual, a group, or an organization) is able to ask about fundamental changes in values, assumptions, and policies. This process is different from single-loop learning, which encourages entities to change only to reduce the difference between expected and obtained results (Argyris, 1976).

In double-loop learning, the learner not only searches for a way to act and reach a goal but also checks that the action itself is fit and proper. Double-loop learning involves reflection on values and norms and the social structure in which these values and norms are practiced. With the pattern of double-loop learning, each learner must have a more dynamic attitude towards change than with one-loop learning (Greenwood, 1998). Argyris (1976) added that an organization accustomed to the pattern of one-loop learning faces difficulty when changing current assumptions because double-loop learning is more dynamic in requiring such changes. Previous and system-wide CSR speeds the process of double-loop learning because the goals of and obstacles to CSR are already a familiar part of the learning process. Thus, if MCS can help to implement CSR, then double-loop learning will encourage employees to actively participate in CSR-related issues. The present study not only demonstrates the effect of CSR on double-loop learning but also explains how this process mediates the relation between CSR and corporate financial performance. A company's commitment to CSR improves its financial performance by reducing the costs of retention and access to capital (McGuire, Sundgren, and Schneeweis, 1988; Sweeney, 2009). However, the critics of this concept reject a direct link between CSR and the financial performance of a company (Mill, 2006; Moore, 2001).

No simple correlation exists between CSR and financial performance because a business benefit is necessary to bridge the relation (Fombrun, 2000). We show that double-loop learning mediates the relation of CSR and corporate financial performance. According to Kaplan and Norton (2000), double-loop learning is a powerful instrument that allows management to work as a team to interpret data and develop a new strategy in accordance with environmental change. Relating to the role of business benefit for bridging the relation of CSR and corporate financial performance (Fombrun, 2000), this study includes the second intervening variable for bridging that relation, which is reputation. Some earlier studies investigate the relation with contradictory results. Sweeney (2009) finds a positive direct relation between CSR and corporate financial performance with certain business benefits, while Mill (2006) finds that CSR has no relation to financial performance.

According to Neville, Bell, and Mengüç (2005), the direct relation between CSR and performance is difficult to explain without a mediating variable, that is, reputation. Furthermore, reputation is a key factor in the success of a company. By promoting the outcome of corporate activity to the public, reputation connects CSR and performance (Neville, Bell, and Mengüç 2005). Thus, we include reputation as an intervening variable in the relation of CSR and performance and investigate the five-fold relationship between MCS, CSR, double-loop learning, the firm's reputation, and the firm's performance. In a 2012 survey conducted by the *Program Peringkat Kinerja Perusahaan Dalam Pengelolaan Lingkungan Hidup* or Ratings Program of Firm Performance in Environmental Management (PROPER), 24% of manufacturing industries in the province of Banten in Indonesia scored "category red" in waste management. This category indicates the worst level of environmental management. The present study, which focuses on industries in Banten Province, contributes to the literature on MCS and CSR.

Literature Review

According to Durden (2008), MCS is able to accommodate the substantive phase of management action. He agrees with Kiviverta (2010) and argues that before disclosing sustainability in accordance with CSR external reporting, a company must be able to manage, measure, and monitor its own economic, social, and environmental performance (Durden, 2008). The company must measure employees' performance and motivate employees to achieve the CSR goal of their employer. The MCS implements CSR policy, and this implementation needs periodic examination. It changes in accordance with changes in the company's internal and external environment. Assumptions and policies that have been formed on the basis of those assumptions may or may not produce the planned results. Such policies may be realized in ways that are completely different from what has been planned.

Changes in a company's environment require each learner to learn quickly (Mundy, 2010). Double-loop learning in the context of organizational learning is not only an activity driven by a policy but is also a continuous test of the policy (Linz and Resch, 2010). According to Davison and Blackman (2005), employees develop a mental model or schema about their organization's CSR that will affect the way they see and react to events in the workplace. In other words, their logical thoughts on CSR become the basis of double-loop learning whereby any member of an organization can contemplate not only whether a deviation in the rules has occurred but also whether the rules must be changed to redefine "deviation" (Argyris, 1976). Double-loop learning can mediate and is hoped to "improve" corporate financial performance. According to Fombrun (2000), correlating CSR and financial performance in a simple way is difficult. A business benefit must exist to bridge the relation. That benefit is the knowledge acquired by employees as they relate double-loop learning to CSR, simultaneously increasing the effectiveness of MCS and the efficiency of the firm. Double-loop learning is known as a problem-solving technique in which the knowledge gained from contemplating anomalies triggers actions to achieve the company's goals, especially efficiency (Dooley, 1999).

Aside from double-loop learning, another business benefit is the CSR's credibility with stakeholders. Social responsibility underpins the firm's reputation, an idea common in the literature. The company that has its reputation for CSR confirmed in external reports shows steady long-term increases in performance (Adams, 2002). The company's reputation affects the prospective consumer's view of the entire corporate operation, including product quality, so they are willing to pay a premium price more than they will pay for a similar product generated by another firm (Sweeney, 2009).

Our framework relates to the MCS introduced by Durden (2008) and extended by Kiviverta (2010). We propose an additional new perspective where CSR can affect double-loop learning and where the concept becomes the intervening variable relating CSR to corporate financial performance. Then, adding an intervening variable,

reputation, as a business benefit with double-loop learning bridges the relation of CSR and corporate financial performance. Figure 1 shows the model of the study.

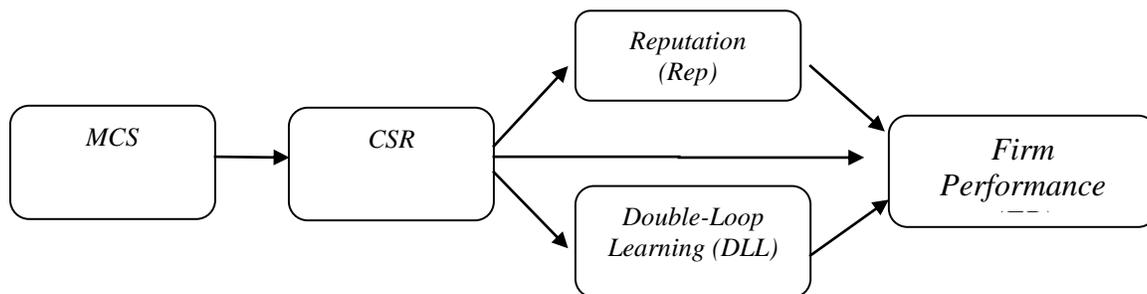


Figure 1. Research Model

In Figure 1, MCS positively affects CSR. Several previous studies have investigated the relation between MCS and CSR (Arjalies and Mundy, 2013; Durden, 2008). However, being only qualitative, those studies cannot measure the strength of the relationship. Thus, we use a *quantitative* method to find whether the relation between MCS and CSR is positive or negative and to measure it. Our first hypothesis (H1) is expressed below.

Furthermore, our second (H2) and third (H3) hypotheses posit that CSR affects reputation and double-loop learning positively. These two variables mediate the relation of CSR and corporate financial performance in our fourth (H4) and fifth (H5) hypotheses. Other researchers study the direct relation between CSR and corporate financial performance but with contradictory findings (Nadeem, 2012; Sweeney, 2009). Drawing a simple correlation between CSR and corporate financial performance is difficult, and a business benefit that can bridge the relation is needed (Fombrun, 2000). Our H2, H3, H4, H5, and H6 aim to determine whether CSR positively affects reputation and double-loop learning and whether any variable can mediate the relation between CSR and corporate financial performance.

1. Hypothesis Development

MCS and CSR

According to Donaldson and Preston (1995), managers are responsible for selecting activities and using resources to obtain benefits for stakeholders. Durden (2008) also says that a resource-based view (RBV) confirms this important role for management, and an MCS must operate in accordance with the principles and goals of stakeholders. The RBV proposes that for an organization to reach its goal, its internal structure must adapt to external conditions. Internal resources are created and external market conditions are met through unique strategic development. According to Taghian (2008), in terms of marketing, a company's CSR is one of the intangible resources unique to the company. Galan (2006) argued that CSR is unique because it incorporates the formal values of the organizational culture. CSRs highlight the strategic role assignment of the existing MCS (Cresti, 2009). The mutual adaptation involves planning and control. Compensation and evaluation, incentive and benefit, are also present along with information sharing and cross-communication (Yuliansyah and Khan, 2015a; Yuliansyah and Khan, 2015b; Yuliansyah et al., 2016a). Consistent and socially oriented planning requires a control system whose objectives can be accurately measured. Only then can managers see whether or not the company achieves its objectives and can employees move in the right direction (Yuliansyah et al., 2017; Yuliansyah et al., 2016b).

H₁. *MCS positively affects CSR.*

CSR and Reputation

Stakeholder theory argues that a firm's performance is determined by its stakeholders' release of resources to trigger a response by the firm (Frooman, 1999). Furthermore, the customer's impression of the product depends not only on the quality, price, and unique selling points but also on the perceived social responsibility of the company to its stakeholders and to society (Fombrun and Shanley, 1990). In a competitive market environment, many companies use CSR to create a good corporate image (Jones, 1995). CSR is a key component of a firm's reputation (Sweeney, 2009), and a good reputation attracts profit, capital, and trading partners (Lai, 2010).

According to RBV theory, tangible resources increase the efficiency and effectiveness of intangible assets (Barney, 2001; Newbert, 2008). The reputation of a company is another intangible resource that is unique to the company and difficult to imitate; the reputation can continue to yield a competitive advantage for a long time (Fombrun and Shanley, 1990; Neville, 2005; Deephouse, 2000). By signaling high product quality, reputation allows a company to take a superior position in the market (Sweeney, 2009). Lai (2010) shows that CSR positively affects the corporate brand reputation. In addition, Sweeney (2009) shows CSR enhancing a firm's business and social reputation.

H₂. CSR positively affects a firm's reputation.

CSR and Double-loop Learning

CSR can be a factor for organizational change, so management of that change should be considered (Kivivirta, 2010). Known and shared CSR in an organization reduces dissonance and strengthens motivation. Employees expect their organization to follow their mental model of CSR, and this condition affects the way they observe an event in the workplace and react to it (Davison and Blackman, 2005). CSR presumes that experience in the real world, and knowledge obtained through reflection results in mental model reframing, that is, learning and creating new knowledge (Davison and Blackman, 2005). Double-loop learning supports new knowledge that has not been learned before often with "unlearning" the "process by which firms eliminate old logic and make room for new ones" (Sinkula, 2002). In summary, CSR affects double-loop learning because people can contemplate changing the rules and not only learning how to fix deviations.

H₃. CSR positively affects double-loop learning.

Reputation and Corporate Financial Performance

Deephouse (2000) defines corporate reputation as an overall media evaluation that is important to stakeholders. Pride and public reputation are crucial to the success of the company (Roberts and Dowling, 2002). According to Fombrun and Shanley (1990), a positive reputation inspires an organization to achieve competitive advantages that allow it to charge a premium and save promotion costs. According to the RBV, resources have value if they increase the efficiency and effectiveness of intangible assets (Newbert, 2007; 2008). Reputation based on effective CSR is difficult to imitate and therefore yields competitive advantages (Neville, 2005). According to Brammer and Millington (2005), a positive and significant relation exists between a firm's reputation and its corporate financial performance. In fact, Neville (2005) states that reputation is the mediating variable between CSR and financial performance.

H₄. Reputation positively affects corporate financial performance.

Double-loop Learning and Corporate Financial Performance

The RBV posits that performance can be affected by how the organization manages its unique resources. One such resource is knowledge, and another is the ability to learn and quickly apply changes based on what is learned (Garvin, 1993). According to Barney (1991), knowledge and information unique to an organization allow for long-term planning that leads to higher corporate efficiency. The knowledge acquired by employees in double-loop learning simultaneously increases process effectiveness and efficiency. One-loop learning focuses on routine activity. Double-loop learning manifests as problem solving, where new knowledge is triggered by anomalies and

where people assume that the anomaly contains within itself the discoverable means to meet performance objectives and increase the efficiency of processes (Dooley, 1999). Thus, we present our fifth hypothesis:

H₅. *Double-loop learning positively affects corporate financial performance.*

CSR and Corporate Financial Performance

Some researchers say that CSRs summarize the expectations of stakeholders, both internal and external, and increase the company's competitiveness in the long term (Webb, 2013). Jorgensen and Knudsen (2006) state that the entire area of the relation between CSR and a firm's performance is questionable. One study supports a light positive relation (Orlitzky, 2001). This relation has been recognized through financial performance mechanisms that are increased by CSR, but it has not been understood well. The RBV explains how to manage resources that are rare and difficult to imitate to achieve a competitive advantage (Barney, 1991). According to Taghian (2008), CSR can be a unique intangible resource for marketing. CSRs incorporate formal values of the firm's culture and Taghian (2008) argues that in the RBV, CSR is a unique intangible resource that is difficult to imitate and eventually leads to a competitive advantage. Other researchers conclude that the effect of CSR on financial performance is negative. The argument continues. The exact relation between CSR and financial performance is important and also difficult to pin down (McGuire and Sundgren, 1988).

H₆. *CSR positively affects corporate financial performance.*

2. RESEARCH METHOD

Population and Sample

The population in this study consists of manufacturing companies located in Banten Province, Indonesia. We choose this population because, first, manufacturing industries have more complex control than other industries (Anthony and Govindarajan, 2007). Second, Banten Province accounts for 60% of all manufacturing companies in Indonesia. Moreover, manufacturing is the major industry in Banten Province, so waste management and industrial environmental issues have to be examined. Third, nearly a quarter (24%) of manufacturing companies in Banten are in the red category, that is, the worst level of environmental management. Prior to questionnaire distribution, it was pretested to clarify understanding of the questions. Pretesting is conducted with companies that are similar but are outside the population area.

Data on manufacturing companies in Banten Province come from various sources, including the Ministry of Industry of Banten Province and the Statistics Centre Bureau. We sent questionnaires to the managers of those companies. We delivered a total of 300 questionnaires directly to 75 companies (see Table 1). A total of 163 respondents from 67 companies returned the questionnaires. Research data to test hypotheses were analyzed using structural equation model (SEM).

Table 1. Data Collection

	Total
Total questionnaires distributed	300
Total questionnaires returned	163
Response rate	54.33%

Measurement of Variables

In the present study, MCS was measured using a two-dimensional construct of the diagnostic system and the interactive system adopted from Henri (2006). Then, CSR was measured using CSR activity affecting reputation and double-loop learning using the study instruments introduced by Sweeney (2009), that is, by evaluating the following: environmental friendliness, recycling of packaging material, production waste, information on labels, response to customer complaints, charity activities, job vacancies with an element of community support, a fair basic wage, and career development for employees. Firm reputation was measured using the study instruments of

Neville (2005) and Sweeney (2009) on business reputation, performance, investment value, quality of products, service quality, management quality, environmental responsibility, and community responsibility. Measurement of double-loop learning emphasizes comprehensive thoughts on assumptions and beliefs (Cartwright, 2002). Feedback on an assumption creates a more effective back-and-forth decision-making process (Argyris, 1976). The functions of double-loop learning proposed by Kaplan and Norton (2000) for quantitative measurement are the following: working as a team to interpret data, development of new strategy, and adaptation to change. Finally, firm performance was measured using the variables used by Henri (2006) and Sweeney (2009), which are sales, net profit, and ratio of net profit to cost.

3. RESULTS

Testing of Data Quality

Validity Test

We test validity using partial least squares (PLS) software. Each construct with a value of average variance extracted (AVE) more than 0.5 can be said to have good discriminatory validity.

Table 2. Fornell–Lacker Criterion

	MCS	CSR	DLL	Rep	FP
MCS	0.892				
CSR	0.972	0.926			
DLL	0.925	0.930	0.868		
Rep	0.924	0.920	0.847	0.845	
FP	0.934	0.928	0.937	0.867	0.916

All variables have an AVE value of at least 0.845, which is well above the 0.5 threshold for validity.

Reliability Test

We test reliability by considering the value of composite reliability from the indicator block measuring the construct. The result is satisfactory if it is above 0.7.

Table 3. Cronbach’s Alpha, Composite Reliability, AVE, R-squared

	Cronbach’s Alpha	Composite Reliability	AVE	R-squared
MCS	0.974	0.977	0.796	
CSR	0.979	0.982	0.858	0.945
DLL	0.836	0.901	0.753	0.865
Rep	0.866	0.909	0.714	0.846
FP	0.905	0.940	0.840	0.904

As shown by the analysis result of reliability test with SmartPLS (Table 3), the value of composite reliability (column 3) has a minimum of 0.901. This result means that the dependent variables (CSR, reputation, double-loop learning, and corporate financial performance) and the independent variable (MCS) have good reliability and internal consistency.

Results and Discussion

Hypothesis 1 states that MCS positively affects CSR. H₁ is accepted where MCS positively and significantly affects CSR. This relation is shown with estimation coefficient value between MCS and CSR of 0.980 and with a significance level of 11.196. The coefficient value of R-squared (R²) is 0.945.

Table 4. Results for Inner Weights

	Original sample estimate	Mean of subsamples	Standard deviation	T-statistic
MCS -> CSR	0.980	0.909	0.088	11.196
CSR -> Reputation	0.966	0.853	0.149	6.482
CSR -> Double-Loop Learning (DLL)	0.955	0.728	0.263	3.636
CSR -> Firm Performance (FP)	-0.055	-0.060	0.206	0.270
Reputation (Rep) -> Firm Performance (FP)	0.575	0.562	0.163	3.519
Double-Loop Learning (DLL)-> Firm Performance (FP)	0.476	0.535	0.156	3.056

As stated in H₂, CSR positively affects a firm’s reputation. This hypothesis is proven. The coefficient value between CSR and reputation is 0.966 with a significance level of 6.482. The coefficient value of R² is 0.846. Thus, H₂ is accepted. Hypothesis 3 shows that CSR positively affects double-loop learning. This premise is proven by a positive path coefficient value of 0.955 with a significance level of 3.636 and an R² value of 0.865. Our finding that H₃ is supported. Hypothesis 4 states that reputation positively affects corporate financial performance. This hypothesis is proven by a positive path coefficient value of 0.575 with a significance level of 3.519. Thus, H₄ is accepted. Hypothesis 5 indicates that double-loop learning positively affects corporate financial performance. This result is proven by an estimation coefficient value of 0.476 with a significance level of 3.056. The coefficient value of R² is 0.904. based on above data, H₅ is accepted. Hypothesis 6 states that CSR positively affects corporate financial performance. We find a T-statistic value of only 0.270. This value is below the t-count of 1.96 that is required to support the hypothesis. A negative effect is observed, but it is not significant. Therefore, we reject H₆.

Path Analysis

CSR Path Analysis of Firm Performance through Reputation

To investigate the indirect effect of CSR on corporate financial performance, we consider the mediating variable reputation. Table 5 presents the path analysis.

Table 5. CSR Path Analysis of Firm Performance through Reputation

Path	Information	Indirect Effect CSR–Firm Performance (FP) (A)	Direct Effect CSR–Reputation (B)	Direct Effect REP–Firm Performance (C)	Indirect Effect A + (BxC)
4	CSR-Rep-FP	-0.055	0.966	0.575	0.500

Based on the preceding calculation, the construct of reputation can mediate the effect of CSR on corporate financial performance. The comparison of direct and indirect effects shows that direct effect (-0.055) < indirect effect (+0.500).

CSR Path Analysis toward Firm Performance through Double-Loop Learning

To investigate the indirect effect of CSR on performance, we look at the addition of indirect effects through the mediating variable double-loop learning. Table 6 shows the path analysis.

Table 6. CSR Path Analysis of Firm Performance through Double-Loop Learning (DLL)

Path	Information	Direct Effect CSR – FP (A)	Direct Effect CSR-DLL (B)	Direct Effect DLL-FP (C)	Indirect Effect A + (BxC)
5	CSR-DLL-FP	-0.055	0.955	0.476	0.399

Based on the preceding calculation table, the construct of double-loop learning can mediate the effect of CSR on corporate financial performance. The comparison of direct and indirect effects shows that direct effect (-0.055) < indirect effect (+0.399). The result of hypothesis testing of relations between MCS, CSR, reputation, double-loop learning, and corporate financial performance is presented in Table 7.

Table 7. Summary of Hypothesis Testing Results

Hypothesis	Hypothesis Statement	Summary
1	MCS positively affects CSR.	Accepted
2	CSR positively affects reputation (Rep).	Accepted
3	CSR positively affects double-loop learning (DLL).	Accepted
4	Reputation (Rep) positively affects firm performance (FP).	Accepted
5	Double-loop learning (DLL) positively affects firm performance (FP).	Accepted
6	CSR positively affects firm performance (FP).	Not accepted

4. Discussion

The result of this study is in accordance with the two underlying theories: stakeholder theory and RBV. The stakeholder theory posits that an organization must be managed ethically to meet the identified needs of stakeholders (Freeman, 1984). Thus, management has to identify and satisfy each stakeholder before finalizing the CSR. In the RBV, the success of an organization is predicated on resources that are important, rare, or difficult to imitate. Focusing on the RBV forces basic changes both in the system and its strategic management to

be able to create value (Barney, 1991; Wernerfelt, 1984). Then, CSRs incorporate the formal values of the company culture (Taghian, 2008). In addition, our study found that CSR positively affects a firm's reputation. This result supports the statement by Jones (1995) that in a highly competitive market environment, CSR responds to the expectations of various parties such as the media, public opinion, nongovernment organizations, and customers by creating a good corporate image. Lai (2010) also finds a positive and significant relation between CSR and reputation. The result of this study also supports the RBV that CSR is a unique resource that is very difficult to imitate and which incorporates formal values (Taghian, 2008). According to Neville (2005), reputation is also a resource formed from positive interaction with stakeholders and enhanced by selected information about the company's activity conveyed to stakeholders. Both statements clarify that CSR can affect a firm's reputation and that CSR is a resource wholly under the company's control.

Hypothesis 3 shows that CSR positively affects double-loop learning. Our findings strengthen the suggestion that any organization with CSR activity can use double-loop learning to foster individual sensitivity toward the dynamics of CSR in their organization. Mental models (schema) developed by employees will affect the way they view events in the workplace and then react to them (Davison and Blackman, 2005). The results of this study cannot be separated from the stakeholder theory and RBV. The stakeholder theory presupposes a framework for stakeholders to examine management practice (Mishra, 2013). Post and Preston (2002) add that successful management of stakeholders also involves learning because the characteristics of stakeholders change from time to time.

According to our study that reputation increases firm performance. The result of this study is in accordance with the findings of Neville (2005) and Sweeney (2009). A company that is considered socially responsible can benefit from its reputation, especially when its public image is boosted by publicity. In addition, its reputation in the business community increases its ability to attract capital and trading partners. Similarly, based on stakeholder theory from employees perspective, the company management systematically attempts to produce benefits for each employee from learning, improved leadership, increased efficiency of working, employee commitment, and reduced costs. The higher the level of double-loop learning, the better the firm's performance (Dooley, 1999). Furthermore, the result of this study is in accordance with the RBV that performance is affected by the way of managing unique resources. One of these resources is knowledge, which includes the ability of an organization to apply changes based on what has been learned (Garvin, 1993).

5. Conclusion And Limitations

Our objective is to examine the effect of MCS on CSR and the effect of CSR on performance mediated by reputation and organizational learning. The present study specifically aims to examine the effect of MCS, including diagnostic control system and interactive control system, on CSR. This study also intends to examine the effect of CSR on reputation and double-loop learning as well as the effect of reputation and double-loop learning on corporate financial performance. Furthermore, this study aims to examine the direct effect of CSR on corporate financial performance and firm performance that is mediated by reputation and double-loop learning. To achieve the goal of the study, we conducted a survey by sending questionnaires to managers of manufacturing companies in Banten Province. Our primary data were the answers to the questionnaire collected from 163 respondents in 43 companies. Research data to test hypotheses were analyzed using SEM, particularly SmartPLS.

Referring to the result of data analysis, hypothesis testing, and discussion, we find the following: **First**, management control system in the form of a diagnostic and interactive system positively and significantly affects corporate social responsibility. This result shows that a company that has MCS based on performance gives high priority to the implementation of CSR as a strategy. **Second**, corporate social responsibility affects reputation and

double-loop learning positively and significantly and facilitates such learning for company employees. **Third**, both reputation and double-loop learning have positive and significant effects on corporate financial performance. The process of knowledge creation through the double-loop learning model validates the legitimacy of the corporate reputation as an instrument to improve performance. **Fourth**, corporate social responsibility does not directly affect financial performance. This result indicates that CSR might be used as a strategy to determine the objective of social activity that will be conducted, but its role in increasing performance directly is unclear. **Fifth**, the indirect effect of CSR on corporate financial performance through reputation and double-loop learning means that CSR activity performed by the company becomes more effective in the form of financial performance if it is supported by business benefits such as reputation and double-loop learning.

This study has several practical implications. First, in designing social responsibility strategies for manufacturing companies, the MCS should focus on performance in the form of simultaneous diagnostics and interaction so that the MCS can help the company to achieve its CSR. Second, manufacturers must maintain their reputation and increase their double-loop learning to seize opportunities as a result of their socially responsible activity, and to achieve optimal corporate financial performance. Third, our definitive finding is that manufacturers should use corporate capabilities, such as double-loop learning, and corporate resources, such as reputation, simultaneously to improve performance.

This study has two limitations. First, it highlights performance measurements that implement MCS in the form of a diagnostic system and an interactive system operating in tandem. The synergy of these systems is expected to provide a maximum result. However, this study does not address how much relative attention should be given to diagnosis and interaction in assisting effective CSR implementation. Second, the empirical model built in this study uses only two of four levers in its levers of control framework. These are interactive and diagnostic. A future study that involves a four-lever framework might provide different results.

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**PASSIONS AND ENTHUSIASMS OF SMALL AND MEDIUM ENTERPRISES (SMES):
A CASE STUDY OF NAKORN RATCHASIMA PROVINCE, THAILAND**

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Abstract. The objective of this research is finding the entrepreneurial passion and enthusiasm variables which effect on enthusiasm for entrepreneurship and persistence of business of small and medium enterprises (SMEs) in Nakorn Ratchasima Province, Thailand. The enthusiasm for entrepreneurship parameters have been identified in 5 parameters, commitment to the product or service, enthusiasm for competition, passion for entrepreneurship, enthusiasm for opportunity and enthusiasm for development parameters. This research finds that the enthusiasm for entrepreneurship consists of commitment to the product or service which mean is 3.50 and S.D.=0.81, enthusiasm for competition which mean is 3.50 and S.D=0.74, passion for entrepreneurship which mean is 3.77 and S.D=0.79, enthusiasm for opportunity which mean is 3.58 and S.D=0.83 and enthusiasm for development which mean is 3.78 and S.D=0.84. The correlation between persistence of business and commitment to the product or service $r=-0.329^{**}$, persistence of business and enthusiasm for competition $r=-0.290^{**}$, persistence of business and passion for entrepreneurship $r=-0.366^{**}$, persistence of business and enthusiasm for opportunity $r=-0.264^{**}$. Commitment to the product or service, enthusiasm for competition, passion for entrepreneurship and enthusiasm for opportunity have the correlation with persistence of business. The entrepreneur who has an enthusiasm for entrepreneurship keeps a persistence of business.

Keywords: Enthusiasm for entrepreneurship; enthusiasm for competition; enthusiasm for opportunity; enthusiasm for development; passion for entrepreneurship

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JEL Classifications: M10

1. Introduction

Entrepreneurs are a considerable force for economic development. Entrepreneurs create businesses or ventures by drawing together, resources and manpower in order to run the business. Research on the factors influencing entrepreneurial passion has a long historical background and extends to the fields of economics, sociology and psychology. Macro-level environmental conditions are the characteristics of entrepreneurial opportunities and the entrepreneurs' behavior which is related to entrepreneurial motives. The small and medium enterprises

performance management process in Thailand consists of six processes such as preparation, planning, implementation, evaluation, revision and application. Small and medium enterprises performance management process in Thailand has a unique process which requires specific capital, personal and organizational management structure then Thailand SMEs require a determination direction and operation for high efficiency within industry to achieve a sustainable competition (Na-Nan, 2016).

Entrepreneurial passion involves extreme feelings and strong identification with entrepreneurial jobs and processes such as, how to influence opportunity or opportunity recognition. Passion is a critical factor in many cognitive and motivational elements of the entrepreneurial process such as entrepreneur's effort (Gaglio & Katz, 2001). The entrepreneur needs to have an enthusiasm for development and competition, especially as the enthusiasm is related to entrepreneurial activity engagement. Enthusiasm provides the entrepreneur with work-related self-efficacy and is positively related to work engagement of the entrepreneur.

The office of Small and Medium Enterprise Promotion of Thailand reported in 2016, that Thailand's Gross Domestic Product (GDP) increased by 3.2% for small and medium enterprise when compared to 2015. It refers to the importance of small and medium enterprise for the Thai economy (Office of Small and Medium Enterprises Promotion, 2011). Government is a key player in disaster recovery process in any given affected economy. Government policies have an influence on any sectors of economy such as financial, social and managerial sectors. The inter-department miscommunication, valuable resources mismanagement and lack of transportation facilities reduce the efficiency of management (Subthum & Ahmad, 2018).

Many entrepreneurial academics highlight the importance of passion and enthusiasm for entrepreneurs, due to the fact that passion and enthusiasm are the main factors of entrepreneurial efforts with reference to business goal commitment. We are also of the opinion that passion and enthusiasm are important, however, there is a limited knowledge in relation to existing literatures on passion and enthusiasm for entrepreneurial activities. Currently, the internet has an influence on business conducting which makes market and business reformed. Many business organizations attempt to get competitive advantages by selling and marketing through social media platforms (Clercq, Honig, & Bruce, 2013; Dolsopol, 2014).

Although, passion and enthusiasm are relevant to entrepreneurship literature, a deeper and more detailed explanation is still required. For instance, what is the influence of passion and enthusiasm on entrepreneurship? It is more important for us to cultivate passion and enthusiasm for entrepreneurship as passion and enthusiasm play a major role in the entrepreneurship development process. Globalization provides many changes for business operations which creates business opportunities for small and medium enterprises. It is a huge opportunity for SMEs which have a support for economic development. One of the biggest challenge for SMEs is social commerce, however more opportunities are generated from population structure and new innovation changes. Business environment changed has direct effect on SMEs future business performance and model (Vongsruluang & Bhatiasevi, 2016).

The research on entrepreneurial passion and enthusiasm is very important for better understanding of entrepreneurship and the development of entrepreneurs. These are among the questions that will contribute to the entrepreneurial academic knowledge and managerial practice throughout this research. This research provides the entrepreneurial academic knowledge on entrepreneurship in the province which is considered the backbone of Thailand's economic development.

2. Literature review

Commitment to the product or service

Entrepreneurial success depends on entrepreneurial performance which is determined by efficiency and company growth; and it is a vital issue in entrepreneurship because it separates an entrepreneurial venture from others (Tasnium & Singh, 2016). Entrepreneurial commitment refers to behavioral concepts (OB) such as endurance, perseverance, passion and self-determination. These behavioral concepts have positive impact on start-up and venture performance (Suliman & Iles, 2000). In order to become highly successful in business, entrepreneurs need to have a high passion and commitment. Commitment is the weapon that encourages the entrepreneurial mindset and directs the entrepreneur to maintain his entrepreneurship and to take the right and important steps to success (Kor, 2001; Nordstrom, Charlotta, Thorgren, & Wincent, 2016). The study of three dimensions of leadership, workplace value ethic and workplace innovation among small and medium enterprises (SMEs) in Thailand and Vietnam find that workplace value ethic has high influence on leadership behavior and design leadership also has a significant effect on workplace innovation. The workplace value ethic and workplace innovation has direct relationship which creates high competitive advantage (Muenjohn & McMurray, 2017).

Enthusiasm for competition

Excitement and enthusiasm are very important for small business operators. Small business operators without excitement and enthusiasm may not be successful. Entrepreneurs need to create a business plan to gain further perspectives and, must understand their product, market and competition. To be excited about the work, entrepreneurs must be passionate from within. One way to develop enthusiasm is to find something connected with your passion and could give you excitement. Real enthusiasm will be engendered and great achievements come from enthusiastic their work. (Pell, 1994) The high competitive market makes small and medium enterprises management changes dramatically in Thailand. The entrepreneurship, corporate brand management and competitive environment has direct influence on corporate performance of small and medium enterprises (SMEs). Competitive environment, entrepreneurship and corporate brand management under Thai society and culture of SMEs have a specific characteristics for corporate performance management (Kamkankaw, Thanitbenjasith, & Sribenjachote, 2017)

Passion for entrepreneurship

Passion for entrepreneurship is an intense feeling and it refers to entrepreneurial activities and processes such as opportunity recognition and venture creation. (Nordstrom, Charlotta, Thorgren, & Wincent, 2016). Passion is strong at the initial stage of the venture and it might decrease at the actual stage of doing the business. Entrepreneurial intensity has five dimensions such as autonomy focus, innovation orientation, proactive capability, risk-taking competency, and competitive aggressiveness mindset. The entrepreneurial intensity and firm performance of small and medium enterprises (SMEs) has a relationship through customer response efficiency, market reaction competency, competitor learning effectiveness and business advantage for Thai small and medium enterprises (Dolsopol, 2014)

Entrepreneurs within the passion domain often create innovation and solve specific problems. Passionate entrepreneurs have high aspirations for business growth and love to work. Entrepreneurial passion plays a critical role for venture success and funding decision. Entrepreneurial passion has a strong positive relationship with entrepreneurial intentions, even when the entrepreneur's self-efficacy has been introduced as a mediator. The relationship between creativity and entrepreneurial intentions has been mediated by entrepreneurial self-efficacy (Biraglia & Kadile, 2017).

Enthusiasm for opportunity

Identifying opportunities in the marketplace is necessary for successful entrepreneurship. Entrepreneurs must therefore evaluate the business objectives that exist in the marketplace. Opportunity recognition must be an acceptable entry barrier which is a competitive advantage as well as a profit potential for entrepreneurs

(Meenakshi & Harini, 2012). There are three main strategies for large and medium enterprises to maintain profitability. One very innovative strategy is the use of a new product introduction to replace or create new market, which comes from opportunity captured by enterprises (Chitakornkijasil, 2011). The entrepreneurial creativity strategy on marketing performance and product advantage consists of saturated skill accumulation, supplier information sharing and advanced learning capacities has a moderate influence on customer requirements responsiveness. Saturated skill accumulation, supplier information sharing and advanced learning capacities have a positive relationship with product strategy (Seakoo, Pansuppawatt, & Jitrawang, 2013).

The innovativeness of opportunity has a positive effect on business growth; it is related to entrepreneurship enthusiasm for identifying opportunities. High innovative entrepreneurship opportunity comes from uncertainties in the business environment; entrepreneurs must respond to the rapidly changing environment (Long, Geng, & Shakeel, 2016; Chitakornkijasil, 2011). Opportunity identification refers to a unique entrepreneurial behavior which is dynamic and process driven. Entrepreneurial alertness is a distinctive set of perceptual and informative processing skills that drives opportunity identification. Understanding the opportunity identification process is one of the main intellectual questions for the domain of entrepreneurship (Gaglio & Katz, 2001).

Enthusiasm for development

Working without limitation, customer preference changes and global processes integrations have changed the traditional business operations of various enterprises. A focus on innovative methods of process development such as improving business operations represent the main competitive advantage for modern entrepreneurship (Lettl & Gemunden, 2005). The accelerations of technology, communication technology and information development are the basis of globalization in any area and aspect of business operations for entrepreneurs. The development of new entrepreneurship in tourism enterprise represents the new forms of business conduct, teamwork encouragement and human resource emphasis. Continued process of human resource development creates the value for competitive advantage of enterprise (Postolov, Sopova, Ivanovska, Petkova, & Josimovski, 2016). The creative economy and creative industry refers to emerging models of economic development. The creative economy and creative industry have direct influence on creativity and intellectual capital for small and medium enterprises (SMEs) economic development and creative value chain is play as the most straightforward in creative industry (Bhatiasevi & Dutot, 2014).

Problem Statement

Small and medium enterprises (SMEs) are considered as the fundamentals of economic development for Thai economy. SMEs have 3 main sectors such as services sector, production sector and trading and maintenance sector. The services sector is an important sector for the Thai economic growth and, it continuously drives the Thai economy. However, there is little or no knowledge of the entrepreneurship passion and enthusiasm of Thai SMEs. The big question is; why would an entrepreneur need passion or enthusiasm and how does it influence entrepreneurial success. It is very important to study entrepreneurial passion and enthusiasm under the Thai SMEs circumstance.

Research Objectives

1. To study the entrepreneurial passion and enthusiasm factors of small and medium enterprises of Lower Northeastern, Thailand.
2. To study on the relationship between entrepreneurial passion and enthusiasm with respect to persistence of business.

3. Research methodology

This is an exploratory research which focuses on new factors with effect on enthusiasm for entrepreneurship and persistence of business in Thai's small and medium enterprises. The research also explores the degree of impact that each factor has on enthusiasm for entrepreneurship and persistence of business. This research adopted a quantitative approach, by using questionnaires. Qualitative contextual tools were also used as first parameter identification. A secondary data was drawn from the review of various existing literatures as well as from the confirmation of research finding.

The research process was started with a review of existing literature. Based on this literature review, a parameter termed 'measurements of procurement skills related issues' was created, which was used to consult with supervisors and experts, before conducting the pilot surveys with the entrepreneurs. The measurements were certainly applied to the final results of the survey. The survey results were analyzed using a mean and SD model. The correlation testing was done on persistence of business and enthusiasm for entrepreneurship parameters. The conclusions were drawn from the study's findings. This exploratory research was focused on 335 small and medium enterprises entrepreneurs who are in the service, production and trading businesses, using the questionnaires developed specifically for the sole purpose of this research. After the data were analyzed, the observations of their behaviors were done to confirm the results finding. Conceptual Framework is provided in Figure 1 below.

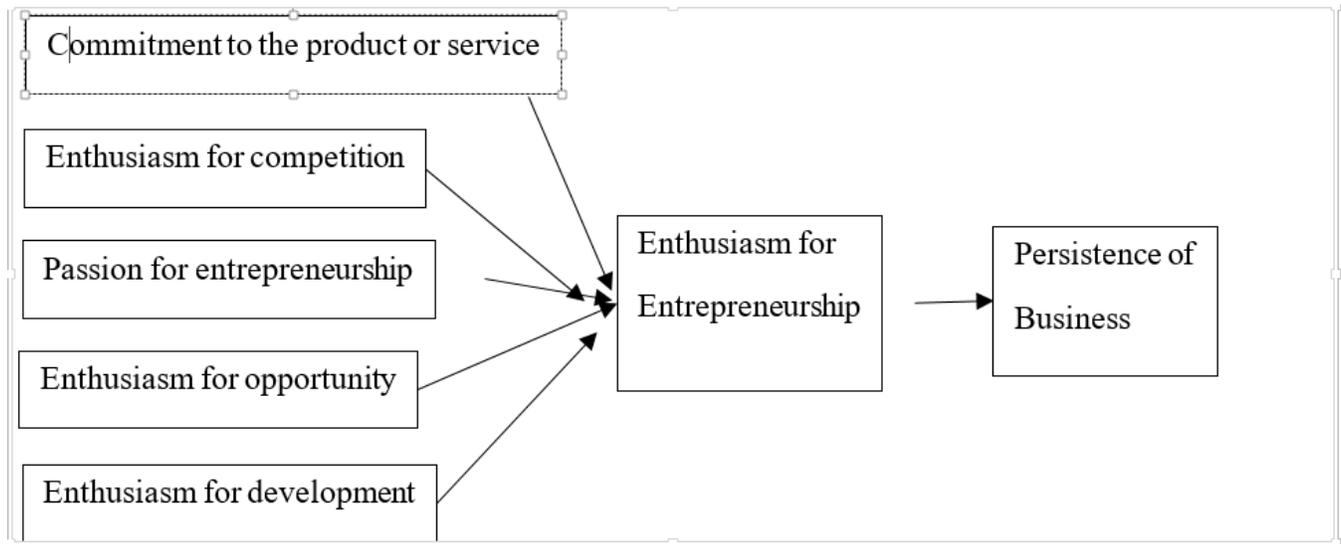


Figure 1. Conceptual Framework

A conceptual framework for studying entrepreneurial enthusiasm and persistence of business was developed according with the update with literature review and with several studies in above (Figure 1). The main constructs leading to enthusiasm for entrepreneurship and persistence of business involve five variables: commitment to the product or service, enthusiasm for competition, passion for entrepreneurship, enthusiasm for opportunity and enthusiasm for development (Ho & Pollack, 2014; Gaglio & Katz, 2001; Warnick, 2016).

To examine the effects of enthusiasm for entrepreneurship variables and persistence of business, the following hypotheses are proposed:

- H1: Commitment to the product or service is positively related to the persistence of Business
- H2: Enthusiasm for competition is positively related to the persistence of business
- H3: Passion for entrepreneurship is positively related to the persistence of business
- H4: Enthusiasm for opportunity is positively related to the persistence of business
- H5: Enthusiasm for development is positively related to the persistence of business

4 Results

Results are presented in Table 1.

Table 1. Enthusiasm for Entrepreneurship Parameters

Factors	Mean	SD
Commitment to the product or service		
1. In the last 2-3 years, you have the new product or service development	3.20	1.15
2. You are interesting on product or service differentiation	3.77	1.15
3. Product or service development takes into account the needs of the customer	4.14	1.08
4. Social media for communication with customer	3.06	1.52
Average	3.54	0.97
Enthusiasm for competition		
1. Price discount strategy for sales improvement	3.05	1.31
2. Competitive advantage by focus on niche segments	3.22	1.15
3. You are continuing to develop new products or services	3.42	1.19
4. You are focusing on sales targets	3.73	1.12
Average	3.36	0.81
Passion for entrepreneurship		
1. You like the challenge of running a business	3.78	1.07
2. You are a people like to meet people	3.98	1.04
3. Your business goal is a victory	3.11	1.19
4. You are brave and do not fell tried	3.66	1.07
Average	3.63	0.80
Enthusiasm for opportunity		
1. You always find information on the business	4.03	0.94
2. You are the leader in product or service change	3.29	1.12
3. You always change your product or service offering methods	3.51	1.10
4. You always have a market analyzing	3.32	1.17
Average	3.54	0.79
Enthusiasm for development		
1. You allocate the budget for new product or service development	3.45	1.26
2. You offer products or services to customer needs	3.98	0.97
3. You employ an enthusiastic staff	3.29	1.55
4. You offer better quality products or services than competitors	3.84	1.08
Average	3.64	0.91
All parameter average	3.54	0.85

* Number of respondents=116

Table 1 shows the mean and S.D results for these variables: Commitment to the product or service, enthusiasm for competition, passion for entrepreneurship, enthusiasm for opportunity and enthusiasm for development. The results found that the entrepreneur responses were in the agreed level in which the mean=3.54 and S.D=0.85. Mean of Commitment to the product or service is 3.54 and S.D=0.97. Based on the customer value based, sales people and entrepreneurial behaviors such as innovativeness, pro-activeness and risk taking have the positive relationship by customer trust in and satisfaction come from sales people who have a product commitment (Douglas, Shahid, & Shows, 2016; Biraglia & Kadile, 2017) . Mean of Enthusiasm for competition is 3.36 and S.D=0.81. Entrepreneurship within the firm is the best and most cost effectiveness to increase the competition in global marketplace. Firms have more entrepreneurial employees who will be given the right support and provided the enthusiasm for their works. Mean of Passion for entrepreneurship is 3.63 and S.D=0.80. Passion for work is an emotional aspect of people’s approach to work and also related to the cognition of the people who are passionate about their work and tend to engage more intensive knowledge processing when required it (Clercq, Honig, & Bruce, 2013). The increasing attention from academic has concentrated on the role of passion in entrepreneurial process which exploiting profitable chance and shaping entrepreneurial objectives and real performance. Passion for entrepreneur is greater persistence, effort, enthusiasm and overall achievement (Ho & Pollack, 2014). Mean of Enthusiasm for opportunity is 3.54 and S.D=0.79. Theoretically, enthusiasm, commitment and preparedness are all demonstrate of passion and enthusiasm, commitment and preparedness relate to an entrepreneurs’ motivation for work engagement. It has an influence on entrepreneurial success (Cardon, Mitteness, & Sudek, 2017; Clercq, Honig, & Bruce, 2013) and Mean of Enthusiasm for development is 3.64 and S.D=0.91. The successful entrepreneurs have an experience structure which formed by the difference of experience. We should develop talent entrepreneurs with the senses of enthusiasm then it will success (Oh, 2018; Gaglio & Katz, 2001).

Table 2. Pearson Correlation between Persistence of Business and Enthusiasm for Entrepreneurship Parameters

(Pearson Correlation)	Commitment to the product or service	Enthusiasm for competition	Passion for entrepreneurship	Enthusiasm for opportunity	Enthusiasm for development
Persistence of Business Pearson Correlation					
Sig. (2-tailed)	-0.329**	-0.290**	-0.366**	-0.264**	-0.180
N	0.001	0.002	0.000	0.006	0.064
	107	107	107	107	107

** Correlation is significant at the 0.01 level (2-tailed)

Form table 2, the correlation between Persistence of Business and Enthusiasm for Entrepreneurship Parameters. The results show that persistence of business and commitment to the product or service $r = -0.329^{**}$ and Sig.)2-tailed (= 0.001 due to Sig. (2-tailed) less than 0.05 then commitment to product or service has a significant level of persistence of business elements. Persistence of business and enthusiasm for competition $r = -0.290^{**}$ and Sig.)2-tailed (= 0.002 due to Sig. (2-tailed) less than 0.05 then enthusiasm for comeption has a significant level of persistence of business elements. Persistence of business and passion for entrepreneurship $r = -0.366^{**}$ and Sig.)2-tailed (= 0.000 due to Sig. (2-tailed) less than 0.05 then passion for entrepreneurship has a significant level of persistence of business elements. Persistence of business and enthusiasm for opportunity $r = -0.264^{**}$ and Sig.)2-tailed (= 0.006 due to Sig. (2-tailed) less than 0.05 then enthusiasm for opportunity has a significant level of persistence of business elements.

The assesment of convergent and discriminate validity has focused on Pearson product-moment correlation coefficient. Results show that all observed variables have high loading on their related factorsand low crossing loadings.They relate highly to each other and less highly to measures of other constructs. The loadings were significant at 0.01 level. This indicateds good convergent and discriminant varidities (Hair, Anderson, Tatham, & Black, 1998)

From table 2, the correlation between Persistence of Business and Enthusiasm for Entrepreneurship Parameters. H1: Commitment to the product or service is positively related to the persistence of business. The result shows that persistence of business and commitment to the product or service $r = -0.329^{**}$ and Sig.)2-tailed (= 0.000 due to Sig. (2-tailed) less than 0.05 then commitment to product or service has a significant level of persistence of business elements.

H2: Enthusiasm for competition is positively related to the persistence of business. Persistence of business and enthusiasm for competition $r = -0.290^{**}$ and Sig.)2-tailed (= 0.000 due to Sig. (2-tailed) less than 0.05, then enthusiasm for competition has a significant level of persistence of business elements.

H3: Passion for entrepreneurship is positively related to the persistence of business. Persistence of business and passion for entrepreneurship $r = -0.366^{**}$ and Sig.)2-tailed (= 0.008 due to Sig. (2-tailed) less than 0.05 then passion for entrepreneurship has a significant level of persistence of business elements.

H4: Enthusiasm for opportunity is positively related to the persistence of business. Persistence of business and enthusiasm for opportunity $r = -0.264^{**}$ and Sig.)2-tailed (= 0.010 due to Sig. (2-tailed) less than 0.05 then enthusiasm for opportunity has a significant level of persistence of business elements.

H5: Enthusiasm for development is positively related to the persistence of business. Enthusiasm for development $r = -0.180$ and Sig.)2-tailed (= 0.010 due to Sig. (2-tailed) more than 0.05, then enthusiasm for development has not a significant level of persistence of business elements.

Conclusions

The study of entrepreneurial passion domains of small and medium enterprises, and their notion on enthusiasm for entrepreneurship and persistence of business. The factors responsible for enthusiasm for entrepreneurship are, commitment to the product or service, enthusiasm for competition, passion for entrepreneurship, enthusiasm for opportunity and enthusiasm for development.

Commitment to product or service refers to the intention of entrepreneurs for their products or service development in the last 2-3 years. Product or service differentiation plays an important role in providing competitive advantage as it will give the product differentiation from competitor (Suliman & Iles, 2000). Now, social media is a common way for customer engagement then product or service communication throughout social media is necessary (Dolsopol, 2014).

Enthusiasm for competition is one of key success factor that gives the entrepreneur more advantage. An entrepreneur who has enthusiasm for competition will focus on niche segments and continuously develop new products or services (Pell, 1994). Sales target is a crucial success factors for entrepreneurship since it refers to revenue achievement.

Passion for entrepreneurship has become one of success factor for entrepreneurship because, an entrepreneur is someone who love the challenges of running a business, love to meet people, focuses on business goal and is very brave (Nordstrom, Charlotta, Thorgren, & Wincent, 2016). Due to the rapid change in the business environment, an entrepreneur must have a passion for entrepreneurship which is a fundamental aspect of business activities and goal achievement.

Enthusiasm for opportunity is a key success factor in entrepreneurial activities and process. This is especially true as entrepreneurs always find business information that will change business plan accordingly (Chitakornkijsil, 2011). An entrepreneur who has enthusiasm for opportunity is a leader in product or service change with respect to customer needs. Due to the fact that customers' needs always changes, products or services must changes for customer satisfaction.

Enthusiasm for development refers to the budget allocation for new products and services development, in order to offer better quality products or services than competitors and according to customers' needs (Lettl & Gemunden, 2005). Furthermore, enthusiasm for development is an enthusiastic staff employment as high potential staff will have high work efficiency.

Commitment to the product or service, enthusiasm for competition, passion for entrepreneurship and enthusiasm for opportunity, have a significant correlation with persistence of business (Bhatiasevi & Dutot, 2014). The entrepreneur who has an enthusiasm for entrepreneurship keeps a persistence of business.

The relationship between entrepreneurial passion and enthusiasm with respect of persistence of business found that commitment to the product or service, enthusiasm for competition, passion for entrepreneurship, enthusiasm for opportunity and enthusiasm for development are positively related to the persistence of business.

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**DYNAMICS AND STRATEGIC DIRECTIONS OF PUBLIC HEALTH PRESERVATION IN
RUSSIAN FEDERATION***

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Abstract. The article analyzes the dynamics of public health in Russia. It is noted that health preservation is not only a task for doctors, but also for other specialists. The authors believe that medical geographers can play a significant role in public health research. The study outlines major trends in the natural demographic movement of the population under the influence of socio-economic factors. The life expectancy of the population of Russia is characterized against the background of other countries. An increase in the number of registered patients and HIV is indicated. It is concluded that insufficient public expenditure on healthcare development in Russia causes negative trends in health protection. The article concludes with the main goals and corresponding objectives for improving public health and ensuring environmental sustainability.

Keywords: public health; habitat; demography; medical geography; depopulation; life expectancy; morbidity; health management

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JEL Classifications: I14, I15, I18

1. Introduction

Sustainable development of any country depends on quality and efficiency of resources used. Human resources play a crucial role in process of development. Life expectancy is one of indicators characterizing quality of human capital, therefore research of its tendencies and, especially, impacting factors and outcomes is widely discussed in

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the scientific literature (e.g. Panfiluk, , Szymańska, 2017; Rusoja et al., 2018, E.,Volchik et al., 2018; Pavlova, Šenfelde, 2017; Khan et al., 2018; Kalyugina, et al. 2018).

According to the World Health Organization (WHO, 2018), the lifestyle accounts for 50% of the overall health impact of the population, 20% falls on the conditions of habitat, another 20% is affected by heredity, and 10% by health care quality. The way of life, the entire social sphere of human activity has a determining effect on the health of the population, thus, public health research should fall beyond medical sciences on to social sciences (Chistobaev, Semenova, 2009). Only an interdisciplinary integrated research ensures the elaboration of accurate forecasts and adequate development programs of the healthcare sector. Such an integrated approach is present in medical geography discipline – the science dealing with the impact of natural and social conditions on the population health in its habitat (e.g. ecological state of the environment, employment and working conditions, living conditions, quality of life; medical geography studies often incorporate the economic aspects of health development; Semenova, 2010; Semenova, Chistobaev, 2015).

By the end of the last century there was an extremely unfavorable demographic situation in Russia. The death rate exceeded the birth rate in many regions of the country; mortality rates were much higher than in developed countries. These trends resulted in negative natural demographic movement – Russia lost some of its population. In 2015, the country was on the 127th place (from 210 countries) on the mortality rate of men and 89th place in terms of the death rate of women. Only in Russia in the early XX century men lived 11 to 12 years less than women and the mortality of the male population at working age was 4 times higher than that of women (Karaeva, 2014; Starodubov, 2006). Among the reasons for the occurrence of such phenomena are the fall in the standard of living of the population and the decline in the quality of medical services.

In the period between 1992 – 2008 Russia had experienced an annual loss of 700 – 800 thousand people, not only due to the excess of the number of deaths over the number of births, but also due to the migration of Russians abroad. The absolute decrease in the population for this period was 8 million people (including 4.8 million migrants), or about 470 thousand people on average per year. If this trend continued by 2050 the country would have been missing up to 30% of its population. The loss of gross domestic product (GDP) due to premature deaths, according to WHO (2018), would be 8.2 trillion rubles. Although after 2008 there have been positive changes in the demographic movement, it is not yet possible to suggest that the demographic problem has been solved.

This article considers the dynamics of public health preservation in Russia from the standpoint of an integrated approach of medical geography.

2. Methodology

The study is based on open source statistical data of Federal State Statistics Service of the Russian Federation (Rosstat), annual reports of the World Health Organization (WHO), and the legal documents of the Russian Federation. Individual provisions are clarified using primary information of health care institutions, private clinics, state and municipal authorities. Previous authors' research is applied with regard to conceptual and methodological provision of medical geography and the territorial organization of public life, while the review on health care management studies are applied to structural assessment of the industry (Semenova, 2011).

There are several scientific approaches applied in the course of research: structural system, geosituational, spatio-temporal, problem-program. The basic methods are statistical, comparative-geographical, program-target. Visualization of figures is done using gapminder online software (Gapminder Tool, 2018). The totality of these approaches and methods allowed to conduct a comprehensive study of the dynamics of the state of public health

in the Russian Federation, to develop policy recommendations for managing public health, including the level of territorial health care.

3. Research results

3.1. Life expectancy dynamics of the Russian population against the background of other countries

One of the key indicators characterizing the health of the population is life expectancy at birth. Figures 1 and 2 show the relative position of individual countries in terms of two indicators: life expectancy at birth and GDP per capita. The sample includes some of the most and least developed countries, as well as countries that are at the stage of active development.

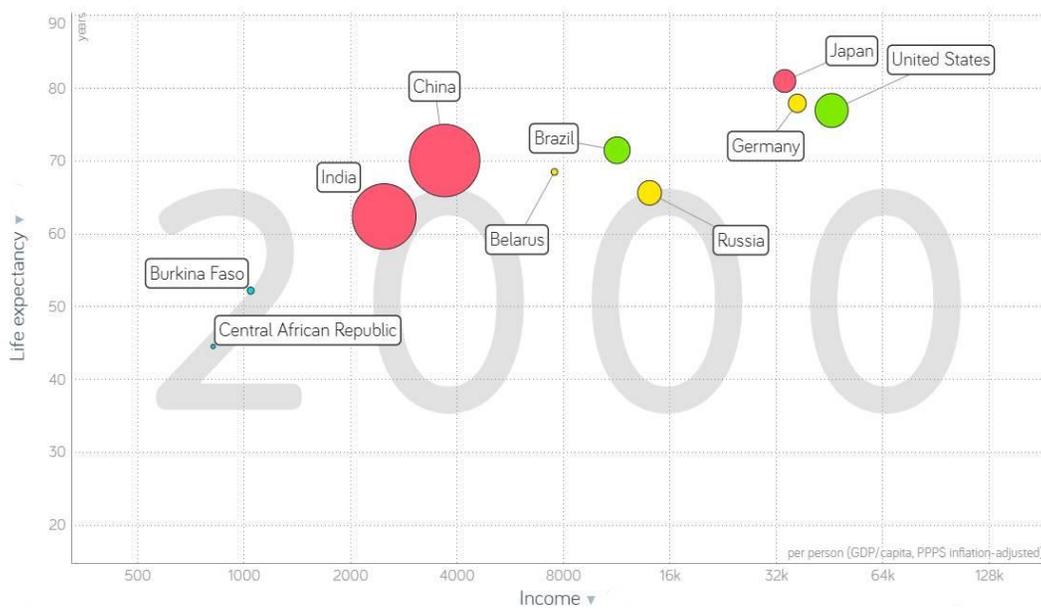


Fig. 1. Life expectancy and GDP per capita by country sample, 2000

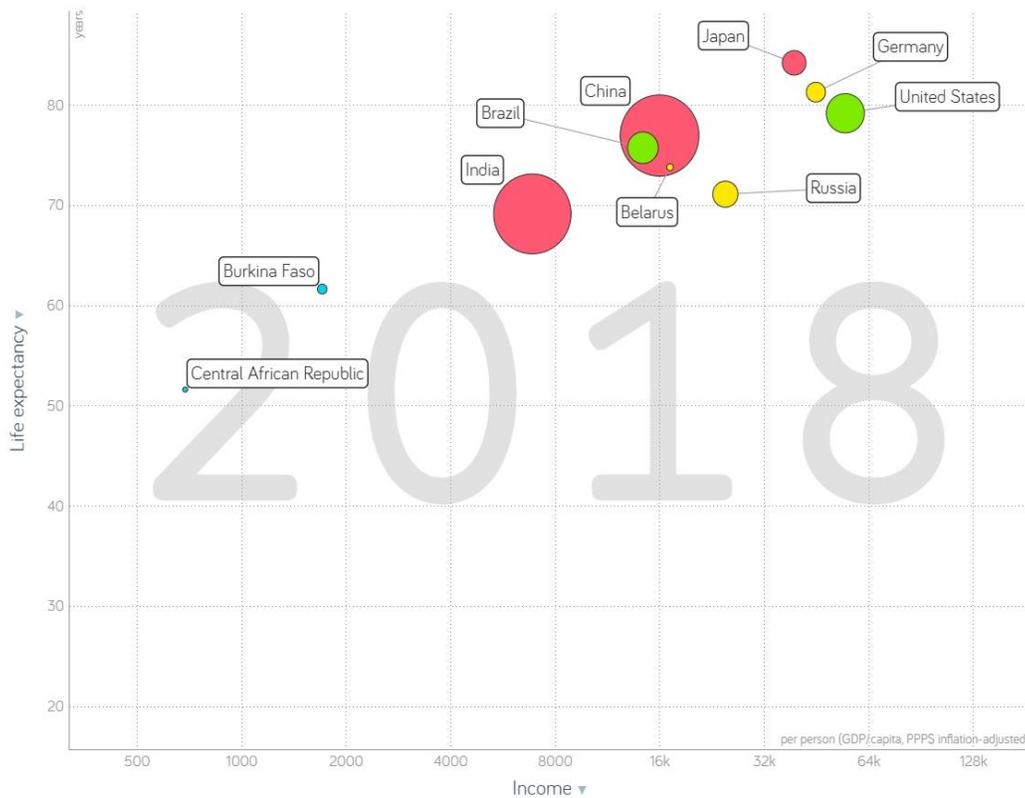


Fig. 2. Life expectancy and GDP per capita by country sample, 2018

Over the past 18 years, all of the countries in the sample have shown an increase in life expectancy, while GDP growth is observed in all countries except for Central African Republic. Particularly significant growth in human development is registered in China and India (Gapminder Tool, 2018). The clustering trend is clearly traced in terms of the indicators presented. There is a leveling of intercountry differences, which meets the challenges of ensuring the sustainable development of the planet.

3.1.1. An analysis of the implementation of public health preservation programs

Since 2005 the Government of the Russian Federation has initiated a number of integrated programs for the development of public health care: the program of additional drug provision for privileged categories of the population; the national priority project “Health”; regional health modernization programs (Takzdorovo, 2018). Thanks to these measures, trends in mortality and life expectancy at birth began to show a positive trend (Figure 3), and improved indicators for population habitat quality (Table 1).

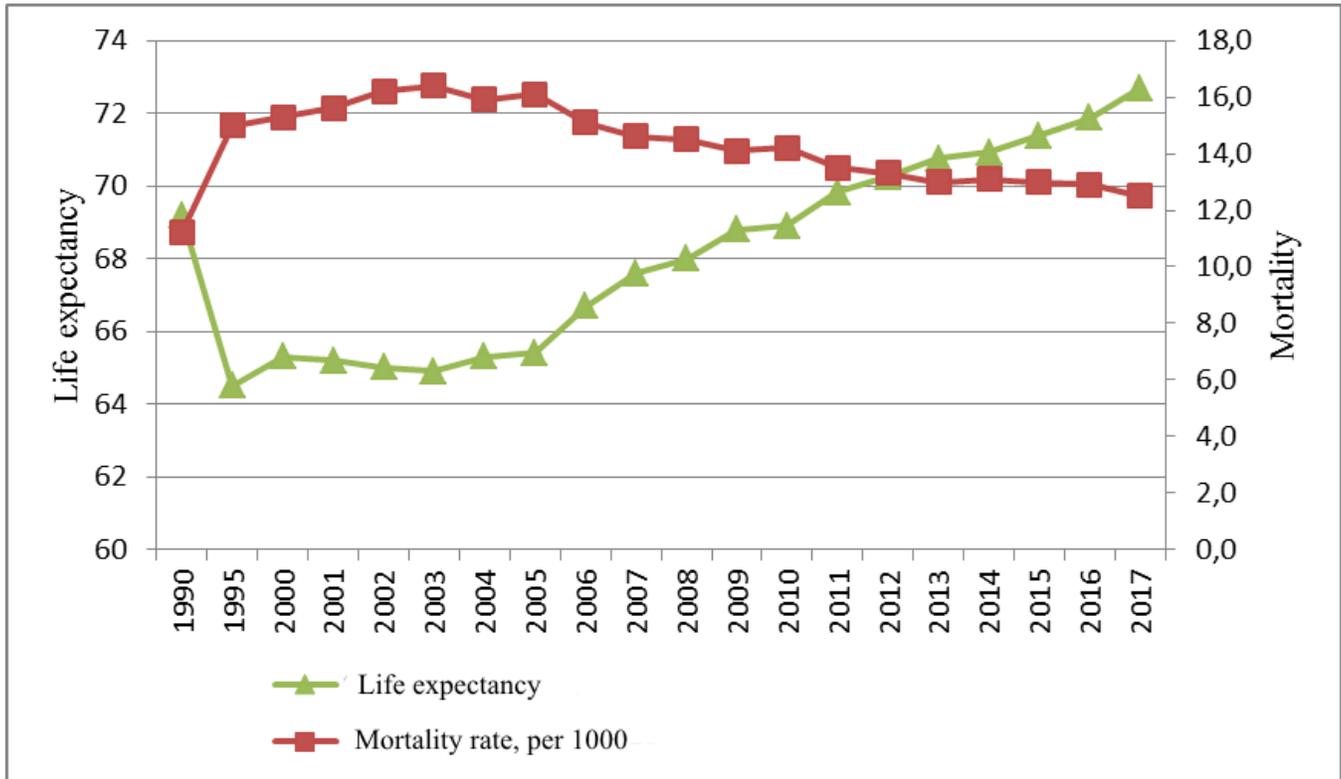


Fig. 3. Life expectancy at birth and death rate per 1000 population, 1990 – 2017

Source: based on (Federal State Statistics Service of the Russian Federation, 2018)

In recent years, public authorities have intensified various forms of support for health and well-being on the part of the population itself: attendance of gym and swimming pool, walking and jogging, skiing, various ways of tempering the body, taking vitamins and minerals, dieting, etc. In general, the dynamics of indicators reflecting the state of health and the habitat has become positive. So, in 2017 the life expectancy of women in comparison with 2000 increased by 5.34 years, for men – by 8.51 years; the mortality of the working-age population from all causes (the number of deaths per 100,000 people) decreased by 90,000 for women and 435,200 for men. But at the same time, the number of registered HIV patients increased more than 12-fold, due both to the spread of the disease itself and to more effective measures to identify, monitor and systematize data on such patients.

Table 1. Indicators of the health status and habitat of the population of Russia for 2000, 2014, 2016, and 2017

Indicators	2000	2014	2016	2017
Life expectancy, years				
women	72.3	75.9	77.06	77.64
men	59.0	64.6	66.5	67.51
Mortality of the working-age population from all causes (number of deaths per 100.000 people):				
women				
men	294.9	242.8	224.9	205
Children who died before the age of 1 year (per 1.000)	1154.2	887.4	800.5	719

live births)	15.3	8.2	6.0	5.5
Maternal mortality (per 100 thousand births)	37.7	11.3	10.0	7.3
Registered patients with HIV infection. persons	78571	463284	870952	943999
Incidence of active tuberculosis. number of patients registered in healthcare institutions:				
total, thousand people	379.9	211.9	178.1	
per 100 thousand people	261.5	147.5	121.3	n.a.
Death rate from tuberculosis. number of deaths per 100 thousand people	20.5	11.3	7.9	6.2
Emissions of pollutants into the atmosphere. million tons	32.3	31.2	31.6	32
Share of housing stock equipped plumbing:				
city	86	90	91	n.a.
village	39	52	58	

Source: based on (Environmental protection in Russia, 2014; Healthcare in Russia, 2013, 2017; Housing in Russia, 2016; Russia in figures, 2015–2017)

In 2008, Russia has joined the WHO framework conference on tobacco control (HIV in Russia, 2017), which intensified the policy of combating tobacco smoking. After the adoption in 2013 of a law banning smoking in public places, selling tobacco products to minors, advertising tobacco, etc. (Federal Law No. 15-FZ of February 23, 2013), the number of smokers began to decline. As a result of the increase in the excise rate, there has been a decrease in the average per capita consumption of alcoholic products (Grigorieva, Bobileva, 2015).

In 2011, the modernization of the Compulsory Medical Insurance (CMI) system began. The management of CMI funds was centralized in the Federal Compulsory Medical Insurance Fund, while the financial independence of regional CMI funds was significantly limited. Starting from 2015, funding for all types of medical care included in the program of state guarantees for the provision of medical care, excluding high-tech medical care and socially significant diseases (HIV / AIDS, tuberculosis, mental illnesses) is made only through the CMI system.

Strengthening the resource provision of healthcare is aimed at improving the skills of medical personnel. It is associated with higher wages, motivation for professional growth, better working conditions. However, until recently all these components of physicians' professionalism were inferior to foreign countries (Kochkina et al., 2015). More than half of the Russian citizens were confident that the professional level of the majority of doctors in Russia is lower than required, and the share of those who perceive doctors to be more concerned about their incomes than patients is 60% (Karaeva, 2014). This mistrust of the population to the medical profession was a serious challenge to the Russian healthcare system, prompting government bodies to take measures for eliminating this negative trend.

In the Decree of the President of the Russian Federation “On the Improvement of Public Health Policy” as of 2012 and the Decree of the President of the Russian Federation “On Measures for the Implementation of the Demographic Policy of the Russian Federation” as of 2018 a set of target indicators for the health status of the population is defined: reduction of mortality from diseases of the blood circulatory system, neoplasms (including malignant), tuberculosis, traffic accidents, infant mortality. To achieve these goals, it was necessary to solve the problem of increasing the average wage, the quality of the services provided. The level of wages in the healthcare system began to correlate with the specific conditions of regional labor markets as well as to take into account the professional achievements of doctors.

Public expenditure on healthcare in real terms has begun to decline after a successful 2012 when it reached its maximum values. In 2013 the decrease amounted to 19%, in 2014 there was a slight increase of 6%, and in 2015 and 2016 there was a decline of 4% and 2%, respectively (Table 2).

Table 2. Indicators of public expenditure on healthcare by sources of financing, bln. rubles

Funding source	Year				
	2012	2013	2014	2015	2016
Federal budget	613.9	502.0	535.6	516.0	506.3
Budgets of constituent entities of the Russian Federation including:	1068.5	1250.9	1316.2	1355.8	1281.2
Contributions to CMI from non-working citizens	298.9	385.7	478.3	640.7	640.7
Contributions to CMI from working citizens	615.1	687.4	733.2	774.9	845.4
Public expenditure on healthcare	2297.5	2440.3	2585.0	2646.7	2632.5
Increase in public expenditure on healthcare in real terms, %	-	6.21	5.92	2.38	-0.5

Source: based on: (Federal State Statistics Service of the Russian Federation, 2018; Russia in figures, 2017; Grigorieva, Bobyleva, 2015)

In the conditions of economic recession (after 2013) in the Russian Federation the budget policy for the healthcare system has become the main political and economic challenge and a source of serious risks. The Government of the Russian Federation has set the task for the sectoral ministries of the social bloc and the authorities of the constituent entities of the Russian Federation to ensure at least 30% increase in wages by optimizing the use of resources and increasing revenues from paid services. However, as practice shows, such “optimization” was accompanied by a reduction in the number of medical workers and medical institutions. In a number of regions there has been a tendency to reduce the level of provision of the population with hospital beds in hospitals, close medical facilities in villages and small towns, reduce the number of doctors, middle and junior medical personnel per capita.

The average salary of doctors in 2015 reached 140% of the average wage in the respective region and since then has remained at about the same level. The salary of the average medical personnel is 4/5, and the salary of the junior medical personnel is 1/2 of the average salary in the corresponding region. However, in a number of regions, reaching these proportions has proved problematic. Therefore, if the national targets set remain unchanged the risk of accelerated reduction in the number of beds and medical personnel, the deterioration in the quality and accessibility of free inpatient medical care to the population will continue.

Managerial decisions on the development of the healthcare sector should take into account the specificity of the morbidity, and, consequently, the corresponding structure of medical services and the availability of medical specialists. In general, the main causes of death (50% of cases) are diseases of the blood circulatory system, in second place – diseases associated with neoplasms. Data in table 3 suggests a reduction in mortality for all groups of causes.

Table 3. Data on the death rate of the population for the main causes of death in the Russian Federation for 2016 – 2017

Causes of death	Number of deaths					
	people			per 100,000 people		
	2016	2017	2017 to 2016, %	2016	2017	2017 to 2016, %
<i>I. Main types of diseases</i>						
infectious and parasitic	32631	32123	98.4	22.3	21.9	98.2
neoplasms	295372	288951	97.8	201.6	196.9	97.7

circulatory system	899953	857980	95.3	614.1	584.7	95.2
respiratory system	68954	60549	87.8	47.1	41.3	87.7
organs of digestion	97157	91571	94.3	66.3	62.4	94.1
<i>2. External factors</i>						
traffic accidents	21570	19885	92.2	14.7	13.6	92.5
accidental alcohol poisoning	8283	6789	82	5.7	4.6	80.7
other poisoning	8818	8116	92	6	5.5	91.7
random drowning	6368	4877	76.6	4.3	3.3	76.7
suicide	22839	20055	87.8	15.6	13.7	87.8
murders	10331	8844	85.6	7	6	85.7
poisoning and exposure to alcohol with uncertain intentions	1709	1650	96.5	1.2	1.1	91.7
other external causes	73599	68568	93.2	50.2	46.7	93

Source: based on (Russia in figures, 2016–2017)

3.1.2. Regional specifics of population health

Causes and correlation of mortality rates in the context of subjects of the Russian Federation correspond to all-Russian trends. Table 4 shows the regions that are defined as the most unfavorable (left part of the table) and the most favorable (right part of the table) from the environmental point of view according to the monitoring results of the NGO “Green Patrol” (Environmental rating of the subjects of the Russian Federation, 2018). In addition, the two largest cities of Russia are additionally represented – Moscow and St. Petersburg.

Table 4. Information on population mortality by reasons of death, per 100 thousand people, 2016 – 2017

Causes of mortality	Subjects of the Russian Federation											
	Sverdlovsk region	Bryansk region	Chelyabinsk region	Moscow region	Irkutsk region	Moscow	St. Petersburg	Tambov Region	Belgorod region	Altai Republic	Altai region	Kursk region
Total deaths 2017	1332.8	1528.1	1301.2	1235.8	1285.7	960.3	1146.6	1515.2	1345.9	964.3	1395.6	1551.1
% to 2016	95.2	98.1	95.6	94.6	96.4	95.9	97.6	95.8	96.8	96.9	99.5	96.2
including												
Infectious and parasitic diseases 2017	47.1	10.5	39.2	12.4	64	11.1	22.6	6.8	4.5	14.7	54.1	9.2
	97.7	87.5	98	100.8	92.4	105.7	100.4	75.6	115.4	88	105.9	88.5
Neoplasms 2017	226.1	240.8	239	174.7	219.3	208.4	256.6	180.1	194.7	146.5	218.9	244.3
	101.9	99.7	100.1	84.5	103.5	98.1	100	96.1	97.8	101.1	98.7	100.6
Diseases of the blood circulatory system	654.6	752.4	573.2	545.5	613.6	529.4	655.1	607.7	722.6	399.7	563.7	699.7
	0.491	0.492	0.441	0.441	0.477	0.551	0.571	0.401	0.537	0.414	0.404	0.451

2017 % of total % to 2016	96.8	100.3	92.1	85	94.1	100.1	94.9	92.7	94.2	95.1	94.9	91.8
Respiratory diseases 2017 % to 2016	43.5	65.2	43.5	42.7	46.6	26.1	35	57.1	41.8	47.3	56.9	73.3
	92.4	93.4	92.6	86.3	81.3	97	77.3	91.1	79.9	90.4	90.5	99.7
Diseases of the digestive system 2017 % to 2016	76.8	84.7	60.5	74.8	57	38.2	47.5	67.3	46	44.6	55.6	69.7
	91.3	97.5	91.1	100.5	89.5	96	96	96	92.2	86.1	90.7	83.6
External causes 2017 % to 2016	128.7	124.7	111.6	96.1	136.9	46.9	54.4	97	65.3	129. 5	106.4	84.6
	85	95.3	85.8	92.9	93.8	96.3	92.2	84.2	87.2	93.2	93.8	83.4

Source: based on (Environmental rating of the subjects of the Russian Federation, 2018; The natural movement of the population in the context of the subjects of the Russian Federation, 2017)

In the regions under review, as in Russia as a whole, in 2017 there was a decrease in mortality in comparison with the previous year; the main cause are diseases of the blood circulatory system. The share of deaths associated with them ranges from 40% in the Tambov region and the Altai Krai to 55% and 57% in Moscow and St. Petersburg, respectively. Neoplasms are on the second place among the mortality causes. The most difficult situation is in the largest cities of the country – Moscow and St. Petersburg (21% and 22%, respectively). The smallest number of deaths from neoplasms is observed in the Tambov region, where this indicator is at the level of 11%. According to the received data, almost all neoplasms are malignant. The third most important indicator is the external causes of death, which include alcohol poisoning, murders, traffic accidents, etc. These are among the highest share in all the regions represented.

On some indicators, there are significant differences between the regions. For example, 64 people per 100 thousand of the Irkutsk region population die from infectious and parasitic diseases, which is more than 14 times greater than the favorable Belgorod region. The first two aforementioned causes of mortality constitute the main challenge for preserving the human potential of the country. In Moscow and St. Petersburg they account for almost 80% of deaths. Reduction of mortality in these categories should become one of the strategic directions of preserving population health. At the level of some municipalities, other ratios of mortality causes may appear, for example, diseases of the respiratory system (Safiullin, 2011). Obviously, this of morbidity causes ratio was affected by the state of the environment, not only outside, but also within industrial enterprises, that is, affected by both living conditions and working environment. Consequently, the objectives of improving the places of residence and work do not lose its relevance. Based on the data presented in the table 4 it follows that the environmental rating of the regions compiled by the NGO “Green Patrol” is not indicative from the point of view of the main causes of mortality in the subjects of the Russian Federation.

Conclusions

Prior to the second millennium the sustainable development was understood as ensuring the environmental security of the population (Glazovsky, 2006). At the same time, the solution of environmental problems was linked with the development of the material and technical base (Chistobayev et al., 2003). At present, sustainable development means the development of a society in which human living conditions are improved, and the environmental impact remains within the economic capacity of the biosphere, so that the natural basis of the functioning of mankind is not destroyed. The level of the state of public health depends on the productivity of

labor, the timing and quality of the production processes performed, and, consequently, the growth rates of the economy, the level and quality of life.

In the modern world the material security of the population is differentiated not only by country, but also within them. The Russian Federation is no exception: poverty reduction is an urgent problem and the main goal of national and regional policy. Achievement of this goal set the following objectives in the public healthcare domain: poverty elimination among non-marginalized groups of population, provision of marginalized people with access to food and housing.

One of the main goals of preserving public health in Russia is to increase life expectancy of the population, to bring the level relevant indicators to those of developed countries of the world. This necessitates to: a) reduce the level of mortality from the main causes; b) orient society towards a healthy lifestyle; c) prevent the death of mothers and children at birth; d) provide the necessary conditions for the social activity of elderly groups of the population.

Reducing the level of socially conditioned infectious diseases remains the responsibility and the target setting of public authorities. Taking into account the trends in population health and the state of environment shown in table 1 the following objectives are outlined: a) stop the spread of HIV / AIDS; b) prevent the expansion of tuberculosis and other socially determined infectious diseases.

The integral goal of improving public health is ensuring environmental sustainability. Among the numerous tasks for its achievement we will single out three main ones: a) incorporate the principles of sustainable development in the program documents on the prevention of losses in the sphere of nature management; b) provide the population with clean water and ecologically clean food; c) improve the quality of living conditions.

The outlined goal and objectives are the essence of strategic directions in the field of preserving public health at the level of the country and its regions.

Population health preservation is a task not only for medical workers or physicians, but also for other specialists, including medical geographers, who use an integrated approach to the study of natural and social systems.

By the end of the last century the life expectancy of the population in Russia was significantly lower than in developed countries. Since 2005, the growth of this indicator has begun – the death rate per 1000 people began to decline. Most of the indicators reflecting the state of public health and its habitat markedly improved. The only exception was the number of registered patients with HIV: their number increased 12 times. Indicators of public expenditure from the federal budget of the constituent entities of the Russian Federation remained approximately at the same level. The increase in state expenditures on health in real terms was insignificant, and in 2016 – negative. The main goals and related tasks in the area of improving public health are to reduce poverty, increase life expectancy, combat HIV / AIDS, tuberculosis and other socially determined infectious diseases, and ensure environmental sustainability.

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THE EFFECT OF HUMAN AND SOCIAL CAPITAL ON ENTREPRENEURIAL ACTIVITIES: A CASE STUDY OF IRAN AND IMPLICATIONS

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Abstract. The present study examined two kinds of capital, human and social, on entrepreneurial activities in Hossein Abad Kalpoush Village, Golestan Province, Iran, using primary and secondary data. We used communicative, structural, and cognitive dimensions to evaluate social capital, while we focused on knowledge, skills, and self-efficacy to investigate human capital. Entrepreneurship development is a complex, long-term, and comprehensive procedure with a major role in the economic development of countries. It has turned into the most strategic and major tool for economic promotion in developed countries. Studies on entrepreneurship have proved that there is a correlation between the rate of entrepreneurship activities and national gross product in some countries. Consequently, it is always accompanied by an enhancement of national income and welfare. Entrepreneurship reveals the opportunities, threats, and weak and strong points of environments, including agriculture, by means of a novel methodology and policymaking in order to revolutionize them. This evolution is accompanied by the presentation of new ideas and methods to solve existing and future problems, thereby improving farmers' economic conditions. The results of this study showed the significant effect of dimensions of human and social capital on entrepreneurial activities.

Keywords: entrepreneurship development; rural entrepreneurship; self-efficiency; social capital

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1. Introduction

Rural development is one of the main priorities of different countries, especially developing ones, and requires a systematic and efficient plan rather than a simple strategy (Tippel, 2006). Many researchers believe that developing various types of entrepreneurship activities in rural areas creates more jobs, produces capital, assists

fair income distribution, and decreases poverty, thereby playing a key role in rural and national development (Najafi & Safa, 2015).

Entrepreneurship is one of the factors affecting rural job creation and development as it creates new jobs to rebuild the economic condition in villages (Tousi et al, 2014). Almost all societies agree that they must strengthen the creation and development of entrepreneurship. Accordingly, they propose various views and methods which can be adopted based on social conditions (Sobel & King, 2008).

Tousi et al. (2014) believe that entrepreneurship in rural areas is not an easy task because of certain restrictions since the concept of entrepreneurship has not been defined in villages despite the presence of many hardworking, innovative, and creative people. This is because of the unfamiliarity with or rejection of entrepreneurship, lack of financial support, lack of access to accurate information, absence of a supportive culture, and a long distance between villages and markets and services. One of the best ways to develop entrepreneurship in rural young generations is focusing on their entrepreneurial features and changing their attitudes towards the creation of new businesses and new jobs based on innovativeness (the tendency to present new ideas), risk-taking (acceptance of unpredictable hazards), inclination to autonomy (concept of self-employment), initiation (being the market leader), and taking an offensive approach (the power of dealing with difficult challenges), thereby developing entrepreneurship (Dess & Lumpkin, 1996, as cited in Talebi et al, 2015).

Opportunities exist in the environment and wait to be discovered, and those with a superior human capital can discover these opportunities (Bhagavatula et al, 2010, Chitsaz, Liang, & Khoshroor, 2017). In other words, those who enjoy a high level of human capital will identify more businesses in a given period of time. Human capital is defined as a series of knowledge and skills acting as input which leads to outputs such as decisions for self-employment and developing entrepreneurial activities (Ucbasaran et al, 2008). On the other hand, social capital largely depends on social and cultural factors, and if people identify it as a form of capital (either in macro-management or in the management of organizations), they will attain a new understanding of socio-economic systems which will help managers towards a better leadership. Such a capital plays a pivotal role in developing entrepreneurial activities as it is a social and economic process which depends on social conditions and context in two ways: a) Entrepreneurs are affected by their own social environment; and b) entrepreneurship is a social activity that is intertwined with social links which affect the nature of businesses (Adler & Kwon, 2002).

With regard to the issues discussed in theoretical research on entrepreneurship development for rural youth, the examination of effective factors can accelerate the entrepreneurship process in villages and reduce employment problems. Previous studies have separately investigated the effect of human capital and social capital on entrepreneurship development, and no comprehensive study is available on the simultaneous effect of these two factors. The present study, therefore, examined both dimensions to see whether human and social capital affect the entrepreneurial activities among young people in Hossein Abad Kalpoush village, Golestan Province, Iran. To this end, we used the descriptive-analytical research method along with structural equation modeling. The rest of this paper is organized as follows: First, we review the literature to enumerate the valuable components related to the research topic. Then, we examine the details of method and results. Finally, we present discussions and conclusions and offer suggestions for future studies to policymakers in the domain of science and industry.

2. Literature review

Generally speaking, there is no difference between rural entrepreneurship and the notion of entrepreneurship in general. The only difference lies in the special conditions of rural areas, including the high risk, lack of facilities, and weak management. Rural entrepreneurship seeks to identify new opportunities, innovation, creativity in agricultural and non-agricultural activities, and the optimal, diverse, and innovative land use in line with rural development.

A method of rural development is entrepreneurship because it significantly affects rural economy and welfare by creating numerous job opportunities. That is why the evaluation of rural entrepreneurship level and its promotion are of special importance for rural development. Although entrepreneurship may have different positive outcomes in rural communities, as a socio-economic and cultural phenomenon, it is itself affected by other contexts, factors, and skills. In other words, the emergence of entrepreneurship in a society depends on different contexts and factors.

Goldin and Katz state that the 20th century was the era of human capital (Acemoglu & Autor, 2012). In this century, human capital became known as the most important asset and resource for creativity and innovation. Human capital affects the growth of societies more than any other factor and is a major motivation for people to choose careers (Estrin et al, 2016). Human capital includes different skills and capabilities such as professional knowledge (Lin, 2011). It can be claimed that human capital shows one's acquired knowledge, created through competency, attitudes, mental agility, and problem-solving skills, and is an important resource for firms' innovation and regeneration (Unger et al., 2011). Human capital is not a physical, neither a financial capital but the knowledge, skill, and self-efficacy of individuals (Hossein Pour and Abdollahi, 2015). Those who have higher knowledge, skills, and self-efficacy, act with more innovation and solve problems more quickly (Alpkan et al, 2010).

Thus, the first hypothesis is formed as follows:

Hypothesis 1: An increase in Human capital leads to a development of entrepreneurship activities.

Social capital includes concepts such as networks, trust, cooperation, participation, equity, responsibility and responsiveness, and commitment and cooperation among community members, estimated as a structure which influences the development of entrepreneurial activities (Cao et al, 2015). It is more than a group of social organizations or social values and often promotes output by increasing the productivity of other sources, including physical and human capital. Social capital is a set of institutions, relationships, and regulations which shape the quality and quantity of social interactions in the society (Ali Abadi et al, 2016). It is alternatively defined as an essential and valuable resource that extends the work environment and investment on which is the key to development (Sainaghi & Baggio, 2014).

Nahapiet and Ghoshal (1998) consider social capital as a series of sources which come into existence through relationships among people. They assume three dimensions for social capital using an organizational view: communicative (relationships among people because of their history of interactions), cognitive (goals, visions, and common values between users in a social system), and structural (the combination of relationships between people and units that means how and to whom someone has access). When people belong to a community with a high level of social capital, they tend to cooperate with one another more and undertake riskier affairs. This rich social capital expands creative and innovative activities and leads to a better performance (Farsi et al, 2013). Hence, the following hypothesis is formed:

Hypothesis 2: An increase in Social capital leads to a development of entrepreneurship activities.

Entrepreneurship exists in various environments, leading to economical growth through a variety of innovations created by people in response to economic situations (Shepherd et al, 2008). It happens in rural areas based on the facilities and environment of villages. According to Pato and Teixeira (2014), rural entrepreneurship means the creation of new businesses, which introduce new products or services, markets, and use of new technologies in villages.

Kai and Jao (2016) concluded that social capital and its dimensions such as communicative, structural, and cognitive capital, impact the entrepreneurship of individuals in China. Moreover, Saleh et al. (2016) examined the relationship between social capital and entrepreneurship for empowerment and concluded that it stimulates entrepreneurship in people and consequently empowers them. Also, in their descriptive studies, Zhang et al. (2015) and Saleem et al. (2018) showed that social norms, control behavior, interpersonal social capital, and social welfare, affecting the development of entrepreneurial intentions in people.

Engelen et al. (2015) noted that, as a social feature, social capital can lead to creativity and innovation and facilitates entrepreneurial behavior in people. In addition, Barnier (2012) examined some influential elements affecting individuals' decisions regarding businesses and identified human capital as a major factor for the establishment of entrepreneurial businesses. In a study exploring entrepreneurship in China, Tang (2010) concluded that individuals who have a high human and social capital and social skills discover more entrepreneurship opportunities. Furthermore, Alpekan and et al. (2010) found that human capital has a significant impact on innovative behaviors among Turkish companies.

It is believed that entrepreneurship development is a process formed by human and social capital (Hindle et al., 2010). Human capital enhances entrepreneurs' ability to take advantage of new opportunities and helps them access physical and financial resources much easier and acquire new knowledge and skills. Ucbasaran et al. (2008) examined entrepreneurial opportunities and concluded that the different dimensions of human capital are related to the identification and incorporation of entrepreneurship opportunities.

Aliabadi et al. (2017) concluded that social capital and its dimensions such as cooperation, coherence, safety, social trust, social and cultural values, valuing life, and communications impact the entrepreneurship of rural youth in Kangaver, Iran. Moreover, Kheirandish and Jamshidi (2017) stated that social capital in organizations and strengthening trust-based communications can enhance entrepreneurial activities. Hosseinpour and Mohammadi (2016) also concluded that human capital is known as a potential resource for encouraging entrepreneurial behaviors in organizations. Finally, according to Yadollahi Farsi et al. (2013), human capital and social capital are among the most important elements in the development of entrepreneurship among rural youths in Korbal, Iran. Based on the literature review, the conceptual model of the present study is presented as follows (Figure 1):

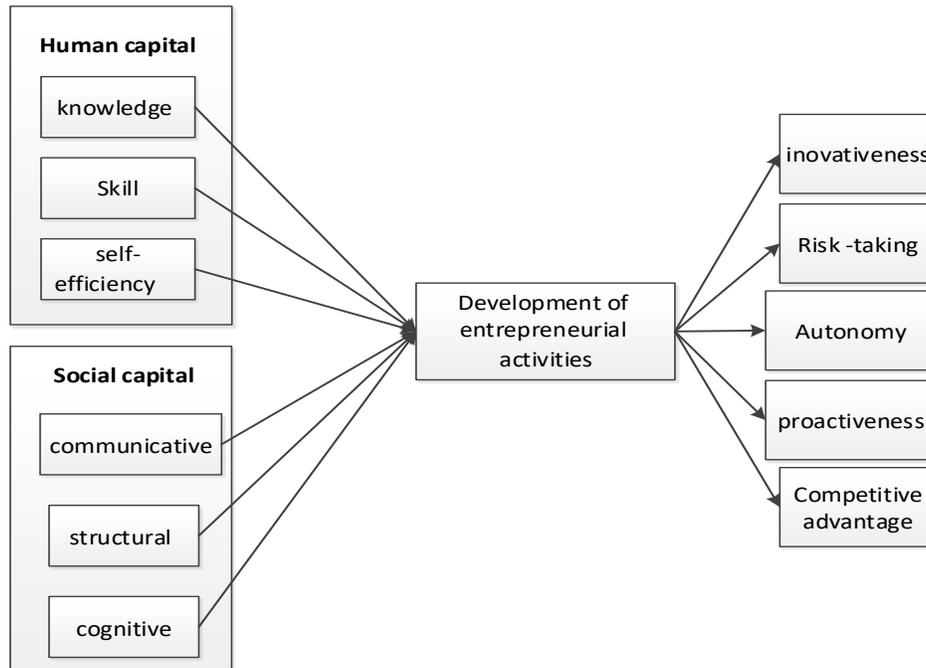


Figure 1. The conceptual model of the study

3. Research Method

The present research is applied in terms of objective and descriptive-analytic with structural equation modeling in terms of data collection. In this study, the effect of variables was analyzed based on coefficients determined in structural equations. Data were collected through the field study method using questionnaires. Finally, we utilized Smart PLS to evaluate and model the relationships among variables.

The data collecting instrument was a standard 36-item questionnaire scored on a five-point Likert scale (Table 1).

Table 1. Data Collection Instrument

Variables	Authors	Number of Items
Human Capital	Hosseinpour and Abdollahi (2015)	9
Social Capital	Nahapiet and Ghoshal (1998)	12
Entrepreneurial activities	Dess and Lumpkin (1996)	15

Experts reviewed the first edition of the questionnaire in order to confirm its content and face validity and corrections were applied based on their comments.

In order to fit and test the hypotheses using structural models, we used the partial least squares (PLS) method using Smart PLS software (Chitsaz & Dapeng, khishsoroor, 2016). This method seems to be the best tool for analyzing studies with a small sample size and complex variables. To analyze the models in this method, we had to examine the fit of the model first and then test the research hypotheses. The fit of the model is examined in two parts: measurement model and structural model (Davari & Rezazadeh, 2013). We employed three indexes of reliability, convergent validity, and divergent validity to assess the fit of the measurement model, and examined combined reliability and Cronbach’s alpha to assess model reliability. Results are presented in Table 2.

Table 2. The reliability of research constructs

Research variables	Cronbach's alpha coefficient	Combined reliability
Human Capital	0.91	0.83
Social Capital	0.93	0.79
Entrepreneurial activities	0.86	0.74

Based on Table 2, it is clear that all variables have a high reliability and the combined reliability and Cronbach's alpha in all cases are above 0.7, proving that research instruments have an appropriate fit.

The validity of the questionnaire was explored using convergent and divergent validity which are specific to structural equation modeling. The criterion of AVE (average variance extracted) shows the correlation of a construct with its own indices. The higher this correlation, the higher the fit. The value of AVE for research constructs is presented in Table 3. In divergent validity, the correlation of a construct with its indices is compared with its correlation with other constructs. The results of divergent validity are depicted in Table 3.

Table 3. The convergent and divergent validity of research constructs

Constructs	1	2	3	4	5	6	7	8	9
AVE	58.0	61.0	73.0	59.0	64.0	71.0	58.0	59.0	70.0
1. Human Capital	76.0								
2. Knowledge	46.0	78.0							
3. Skill	58.0	41.0	85.0						
4. Self-efficiency	47.0	52.0	42.0	76.0					
5. Social Capital	44.0	38.0	51.0	59.0	80.0				
6. Cognitive dimension	32.0	38.0	34.0	47.0	63.0	84.0			
7. structural dimension	27.0	34.0	29.0	33.0	58.0	56.0	76.0		
8. Communicative dimension	43.0	36.0	46.0	27.0	47.0	57.0	63.0	76.0	
9. Entrepreneurial activities	29.0	22.0	37.0	41.0	46.0	38.0	59.0	39.0	83.0

The results in Table 3 prove that the AVE of all constructs is higher than 0.5, confirming the model's convergent validity and the fit of measurement models. Also, results of divergent validity (in the main diagonal matrix) show that research constructs have a higher degree of interaction with their own indices compared with other constructs, and thus the divergent validity of the model is acceptable.

4. Results

The young people in Hossein Abad Kalpoush village, Golestan Province, made up the statistical population of this study. Ninety people were selected through simple random sampling due to restricted access to young people in rural areas. Next, we examined the relations between the variables using the PLS and results were recorded in two modes of T-values and standardized estimation. First, we utilized the Bootstrapping command in Smart PLS to confirm the research hypotheses. The output shows the sum of T-coefficients (Figure 2). When the value of T is more than +1.96 or less than -1.96, the parameter is significant and research hypotheses are confirmed. We can clearly understand from Figure 2 that all T-coefficients among variables (numbers in parentheses) are higher than 1.96, confirming the research hypotheses. Then, we assessed the cause-and-effect relation between research constructs using Smart PLS (standardized estimation). Based on Figure 2, there is a significant positive relationship between variables. Thus, human and social capital have positive and significant effects on the development of entrepreneurial activities. A brief summary is provided in Table 4.

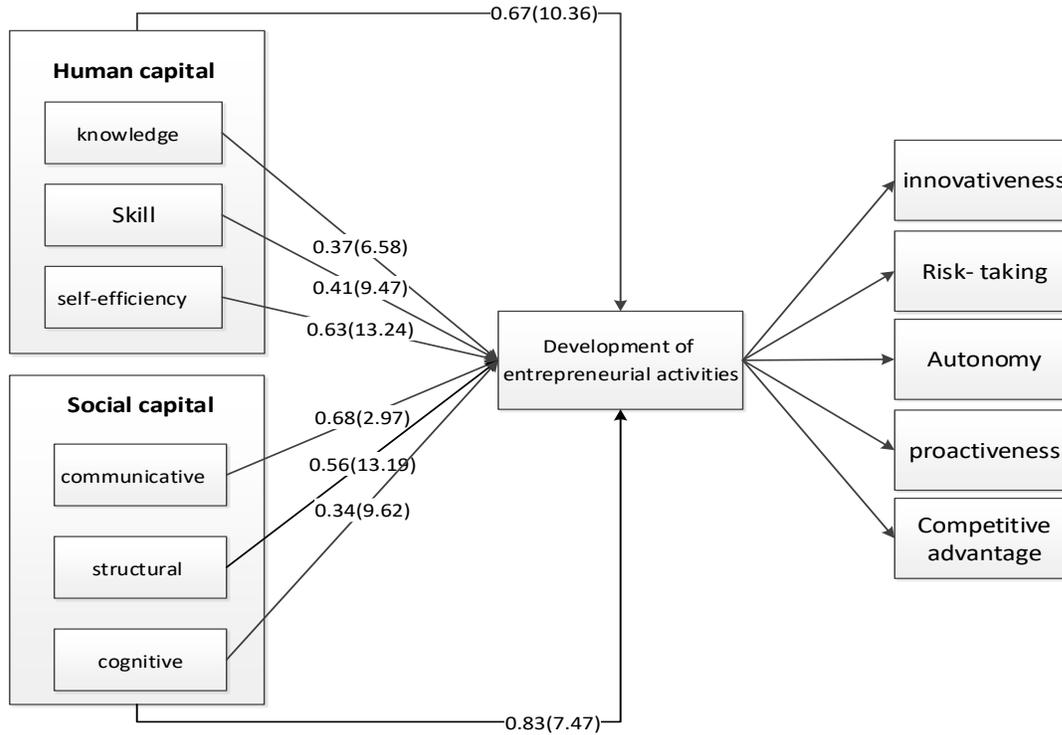


Figure 2. Execution of the model in two models of t-values and standardized estimation

The results of model execution in two modes of T-values and standardized estimation are presented in Table 4.

Table 4. Results of testing the research hypotheses

Hypotheses	T-value statistic	Standardized Coefficients	Hypothesis
Human Capital → Development of entrepreneurial activities	10.36	0.67	hypothesis approved
Social Capital → Development of entrepreneurial activities	7.47	0.83	hypothesis approved
Knowledge → Development of entrepreneurial activities	6.58	0.37	hypothesis approved
Skills → Development of entrepreneurial activities	9.47	0.41	hypothesis approved
Self-efficiency → Development of entrepreneurial activities	13.24	0.63	hypothesis approved
Communicative dimension → Development of entrepreneurial activities	2.97	0.68	hypothesis approved
Structural dimension → Development of entrepreneurial activities	13.19	0.56	hypothesis approved
Cognitive dimension → Development of entrepreneurial activities	9.62	0.34	hypothesis approved

5. Discussion and Conclusion

The main objective of the present research was examining the effect of human and social capital on the development of entrepreneurial activities in an applied study. The sample comprised 90 residents of Hossein Abad Kalpoush village in Golestan Province who filled out a questionnaire scored on a five-point Likert scale. Results were analyzed using a structural equation modeling software.

As mentioned before, modern societies changed dramatically compared to the past. Therefore, it is necessary to look for elements which may contribute to the development of entrepreneurial activities. Results of the first

hypothesis (i.e. the impact of human capital on the development of entrepreneurial activities) and sub-hypotheses of human capital dimensions indicated that human capital and its dimensions such as knowledge, skills, and self-efficiency influence the development of rural youths' entrepreneurial activities. Consequently, one of the factors affecting the development of entrepreneurial activities is human capital which not only prepares the conditions for identification, evaluation, and exploitation of diverse entrepreneurship opportunities, but also affects people's entrepreneurial intention and behaviors. In line with this hypothesis, Hindle et al. (2009) assert that the process of entrepreneurship development is formed by human capital. Also, Atger et al. (2011) contend that human capital increases competencies for discovering and utilizing opportunities and helps people access other useful physical and financial resources easier and acquire new skills and knowledge. Consistent with the present study, results of Barnier's (2012) and Hosseinpour and Mohammadi's (2015) studies showed that human capital with knowledge, skills, and self-efficiency can lead to entrepreneurial behaviors. Therefore, we conclude that human capital as an input leads to outputs such as decision for self-employment and development of entrepreneurial activities among the rural youth.

Results of the second hypothesis (i.e. the impact of social capital on the development of entrepreneurial activities) and its sub-hypotheses related to social capital dimensions indicated that dimensions of social capital (cognitive, structural, and communicative) can affect the development of rural youth' entrepreneurial activities. Social capital refers to the connections and communications among members in a community. It helps members realize their goals by creating norms and mutual trust. Societies which enjoy a good social capital affect the information exchange and knowledge distribution among society members and thus lead to novel opinions and creativity, thereby resulting in the development of entrepreneurial activities. Results of this hypothesis were consistent with studies by Zhang et al. (2015), Engelen et al. (2015), Cai et al. (2016) who concluded that attention to social norms, restricted behaviors, and social capital promotes entrepreneurial behaviors. Moreover, results of the present study were confirmed by Abdollahi et al. (2016) and Kheirandish and Jamshidi (2015) who concluded that social capital is a key factor in entrepreneurship development.

Based on the results of hypotheses, the following suggestions are made: To enhance human capital, knowledge, skills, and self-efficiency must be highlighted in youths in villages. Decision-makers can enhance these indices by holding entrepreneurship and business planning courses. They can also distribute booklets to enhance the knowledge of rural youth. To promote social capital, information can be shared among young people using communication networks inside and outside villages to enhance innovativeness and new opportunities. Moreover, encouragement for establishing social institutions is a structural solution to promote social capital. In these institutions, people find a common identity to advance group cooperation. Such institutions can be created in organizations and businesses at the individual and group level. Furthermore, professional and specialized groups and associations can promote social capital.

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BUSINESS MODEL AND TEAM AS PRECONDITIONS OF A START-UP VIABILITY*

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Abstract. Start-ups are an attractive topic for research because they are a relatively new and very dynamic business form. They carry out original business ideas, provide a space for self-realization of independent personalities, bring extra earnings, but most of them fail. The aim of the research was to examine whether the business model and start-up team like two basic assumptions are really some reasons of the viability and later potential start-up success. The result of the research is a knowledge on the structure and functionality of the start-up business model and start-up team. The viability of the start-up had been measured in shape of its business performance. An intensity and structure of the relationships between performance of start-up and its business model and team should confirm its capability to survive and thrive. These relationships are modelled on the base of regression analysis. The research has largely confirmed the existence of desired relationships to a certain extent, but the effect of the studied preconditions is internally considerably differentiated.

Keywords: start-up; business model; business idea development; team, leader; performance

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1. Introduction

Start-ups are a relatively new and highly dynamic business form, providing space for both individual and team self-realisation, providing space to realize unconventional business ideas, space for quick even exponential growth and scaling. Start-ups create new working places; they bear the business risk unacceptable for established companies, they spread an innovative business culture, they are a source of potentially high incomes, as well as unexpected disappointments and failures. American information agency CB Insights (2016) assembled rank of most common causes of failed start-ups, which are a business making without demand, exhaustion of money for the operation, non-collaborative team, smarter competition, wrong determination of cost and price and at last dysfunctional business model. Most of the failures have a common denominator in inefficient and very little functioning business model. A considerable share of failures can be attributed to internal relations in a start-up, formal and informal division of labour, leadership and team management.

Research of start-up weaknesses (KPMG 2014, p. 34) states that these include financial planning, expansion into new markets, resource acquisition (fundraising), critical thinking, the perception of risk, presentation skills, the creation of business models, business intuition, brand building and leadership skills. Investors in another study claim (KPMG 2016, p. 23), that important investment criteria apart from the quality of managerial team are product and its sale potential. Return on investment is at the end of the list. Founders of start-ups receive a clear signal that they must build a big business firstly which will be later accompanied by financial returns.

Research reports of European Start-up Monitor (Kollmann et al., 2015, 2016) provides formal data on leaders, teams and business models of start-ups, but they do not deal with their internal structure based on soft data or explicitly investigate their impact on start-up performance. They consider them important, but without further findings and conclusions. In the 2016 report (Kollmann et al., p. 3), the finding of a profitable and repeatable business model, scaling, sales growth and the acquisition of new customers are considered to be the greatest challenges. Similarly, the Booming Berlin (2016, p. 9) report on the Berlin start-up scene assumes that a functioning business model of a start-up is a prerequisite for the origin of a growing company within five year period.

The business model and, in particular, the start-up team and its leader are important investment criteria for angel investors and venture capitalists. According to Sipola (2015, p. 72), investment readiness increases the hope that the start-up will become an enduring enterprise. Miloud et al. (2012) state that the criteria of venture capitalists who evaluate a start-up are e. g. product differentiation, R&D intensity, solo founder/founder team, entrepreneur/top management team, team completeness and so on. Söderblom and Samuelsson (2014, p. 41) wrote in an empirical study that the investment criterion of a start-up is a founding team and other criteria are founder debt, founder equity and funding strategy that affect the potential of the business model.

Research reports and empirical studies highlight the importance of the business model and the team for the progress and improvement of a start-up, but they do not go on in this topic. Pfeifer et al. (2017) write that, despite the importance of the business model for entrepreneurial performance, the diversity of business models in the creative industries is little known, but their research has only been carried out on the basis of several case studies. The chaotic leadership of the start-up team is again highlighted by Gulatia and DeSantola (2016). Large studies describe the formalities of the start-ups and more profound research is only episodic.

Some studies (Ensley, Pearce, 2001; Kita, Šimberová, 2018) have confirmed the links between leadership and business performance of start-ups. Peterson et al. (2009), on the base of the survey of 49 start-ups and 56 established companies, found that vertical leadership had a stronger impact on start-up performance than on the performance of mature companies. Hmieleski, Cole, and Baron (2012) conducted the study on the sample of 179

start-ups in the USA with an average age of 48 months, which showed that team leadership is a significant positive predictor of the creative atmosphere and hence the high start-up performance. However, there is no study that would examine both the influence of vertical and team leadership on start-up performance. The need for such research is implied by Zäch and Baldegger (2017) who, after confirming the positive influence of the vertical leadership on start-up performance on a 124 start-ups sample, propose researching an impact of team leadership.

Analysis of the business model and team and exploration of their connection with the performance of a start-up should contribute to deepening and expanding the knowledge of this currently very attractive business phenomenon. Based on a literature study, it can be assumed that the key conditions for a viable and successful start-up are an effective business model and team. The business model is an instrument and means for the entrepreneurial realization of the idea. The start-up team, in turn, designs and operates the model with its vision, enthusiasm, and working effort.

The goal of the research is to deepen the knowledge about the structure of the start-up business model, the traits of its leader and the team and to verify their impact on the start-up viability. The first partial goal is to explore the business model and its structure, the start-up leader and the start-up team whose role changes in the business idea cycle. The second partial goal is to examine the impact of the business model, start-up leader and start-up team on business performance of start-up. The working hypothesis is that a developed business model and a visionary, creative and hardworking team are key and central prerequisites for start-up success. The hypothesis should be confirmed by the existence and tightness of the relationship between the development degree (quality) of the business model, leadership, teamwork, and performance of start-up.

2. Start-up and business model

Start-up is a small starting company with the unverified business idea. N. Thanedar (2012) distinguishes start-ups from small companies. Small companies aim to create profits and growth potential. Thiel (2014, pp. 10 - 11), one of the PayPal founders, does not perceive start-up as a precisely defined business entity. For him, start-up is above all a community of people, who connected with a purpose to achieve exceptional goal via extraordinary intellectual effort and unconventional business culture. According to Thiel and his partial characteristics of a start-up, it is possible to assume that start-up is a modern cultural-business phenomenon, which is less formal than any common company, however not without rules. Coordinating and welding link of a start-up could be an unbound individual self-realisation.

Acclaimed business matadors Blank and Dorf (2012, p. XVII) describe start-up in a more formal way than Thiel. They state that "Start-up is a temporary organisation to seek scalable, repeatable and profitable business model." Entrepreneurs establish a company with a vision to change the world, believing their company will earn millions if not billions of dollars. Scaling demands an investment of external venture capital in tens of millions to satisfy quick expansion.

Creators of visualisation canvas Osterwalder, Pigneurs a Bernarda (2014, p. XVIII) are not explicitly devoting to definition of start-up in their latest work, but their characteristic of start-up entrepreneur describes inner relationships in this business entity: "Start-up entrepreneur acts within other limitations than chief of new business project within an existing company. He must bring proof that ideas are functional even with a restricted budget, he must attract an interest of investors (if an idea is being developed), he must risk spending money before finding the right value for customers and business model. Resulting from stated, start-up is constantly under pressure to affirm its existence, it works under considerably limited and dramatic conditions and is still expected to produce a result, which is acceptance of product on the market and attractive revenue for the investor.

Ries (2011, p. 27), who entered the business world with the concept of lean start-up states: "Start-up is a human institution meant to create a new product or service in conditions of extreme uncertainty." He chooses the term of the institution because start-up hires creative people, coordinates their activities and defines company culture which brings results. The contribution of Ries towards defining start-up lies especially in adding an unpredictable context which distinguishes start-up from any common company. It could be deduced indirectly that start-up is a creator of future, a creator of new needs and it creates business opportunities more than it finds them.

A key attribute of start-up is an ability to grow. Graham (2013) explains that start-up is a company designed for quick expansion. Emphasis is put on unlimited geographical growth, which distinguishes it from a small business. A restaurant in a small town is not a start-up, neither is a franchise.

Mentioned insights and observations and could be summarised as follows. Start-up works in an environment of uncertainty and vagueness, but simultaneously it tries to find actual and applicable solutions, it grows dynamically and without limits, employs people giving up certainties of usual employment for possibility of exciting personal growth and achieving concrete goals, it can but it does not have to work on the base of technology and ceases to be a start-up after crossing certain borders (incomes, profit, number of employees, acquisition, and others). Start-up differs from the small and medium-sized enterprise ([ww.podnikajte.sk](http://www.podnikajte.sk)) with globally unique and innovative product with the potential of dynamic and global growth with an expectation to have an income of tens of millions euros.

The business model includes and displays all relevant sources, processes, and conditions which connect hypothesis (reason and consequence): If an enterprise offers a customer an acceptable value, so it earns an adequate profit. Burns (2014, p. 13) at first uses the term a frame of new business creation which is to provide with the entire procedure to find, develop and improve a business idea. Later he uses the term of the business model; he describes (2014, p. 87), that it is in the centre of the frame of new business creation. Business Model Institute (BMI) prepared a scheme with parts in the shape of a circle. Muehlhausen states (2013, p. 61) that this visualisation of business model starts with an assumption that all important business models have an excellent offer, an ability to monetize offer and ability to sustain it. Gassmann et al. (2014, p. 7) assembled a simple visualisation which is arranged as a triangle. The purpose of this scheme is to get a clear perception of customer segments, customer value proposition, value chain and generation of profit and offers a starting point for upcoming innovations. Most widespread visualisation of business model is a concept of *canvas* created by authors Osterwalder and Pigneur (2009, pp. 15 – 44). Their nine blocks model is widely cited. It will be described in research methodology.

Purpose and usefulness of the business model are confirmed by Blank and Dorf (2012, pp. 8 – 18) when they write „ ... the only aim of a start-up is to find repeated and scalable business model“. While existing companies realise business model, start-ups seek it. In accordance with Blank (2013), this difference is a core of the lean method. Instead of months of planning and market researches, entrepreneurs recognize that they have only a small number of unverified hypothesis, presumptions rather. Instead of a complicated business plan, they summarize their hypotheses into the concept of *canvas business model*.

The business model in studies of causes of start-up failure is indicated as an important reason. Statements of experienced entrepreneurs and start-uppers confirm this knowledge. Successful start-up entrepreneur Truban writes (m.facebook.com/michal.truban) that an idea has a very small value and it is never unique. In the discussion, he adds that the real value of a company lies in the business model. The business idea in the early phases of start-up development covers and obscures many conditions essential for business making while the considerable share of them is just formed by the business model.

Theorists and practitioners intuitively have a feeling that a functional business model is a key condition for the existence and success of a start-up, but they do not provide strict evidence. They do not deal with a structure of business model and functionality of its elements in conditions of sharply developing micro-enterprise such as start-up. It is not known what happens inside of business model, how it gradually forms, what are consequences on business performance, even though this knowledge could contribute to the viability of start-up.

3. Leadership in a start-up team

The foundation and development of start-up is inevitably connected with leadership (Zäch, Baldegger, 2017). Leadership is an inseparable part of the action of a founder and represents a basic factor for the successful development of a business (Cogliser, Brigham, 2004). Start-up without a leader who creates and communicates vision, inspires and coaches employees, acts on a market aimlessly (Zäch, Baldegger, 2017). Start-up teams need to determine the initial goals and to set a working system (Williamson, 2000). According to Bryant (2004), the start-up team must be lead because there are no standard operating procedures or organizational structures in start-ups. Similarly Ensley, Hmieleski and Pearce (2006) state that start-up teams in comparison of teams of large, established corporations have not well-defined goals, structures, and working processes. Despite this, there exist very few empirical studies explaining leadership in start-ups. Most authors are matched that in start-ups there exist vertical leadership based on notions and decisions of a single person (leader) and team leadership, which involves into decision making the team members too.

3.1 Vertical leadership in start-up

Vertical leadership is based on the nominated leader. The person on a higher level of the hierarchy is formally entitled to influence actions of people on lower levels (Ensley, Hmieleski, Pearce, 2006). This type of leadership allows to clearly distinguish the role of a leader from the role of followers (Pearce, 2004). This concept dominates the literature of leadership. Studies show that, although start-ups are often established by a team of people, one member often emerges as a chief (Ensley, Carland, Carland, 2000). According to Klotzet et al. (2014) studies usually focus on the role of the founder (leader) in the development of the new company. Baum, Locke, and Kirkpatrick (1998) found out that inspiration and vision of the founder are the driving force of any start-up. Similarly, according to Timmons and Spinelli (2008), it is fundamental to the success of a start-up that founder is a strong leader. Vertical leadership is very effective in conducting dramatic changes (Dunphy, Stace, 1993). Many studies (Gupta et al., 2004, Ireland et al., 2003) have confirmed that vertical leadership is essential for leading start-ups toward high growth. Similarly, many empirical studies reported a positive relationship between vertical leadership behaviour and different performance indicators of start-ups (Gooty et al., 2009, Gumusluoglu, Ilsev, 2007, Wang, Tsui and Xin, 2011).

Vertical leadership is visible in start-up especially in the early phases of the life cycle. It is usually an individual with leading or visionary abilities who identifies business opportunities and establishes a new company. Baum, Locke, and Kirkpatrick (1998) state that the role of a leader as the founder of a start-up is to create a vision of new enterprise and influence others (investors, employees, partners, and customers) "to buy his dreams." According to Bryant (2004) leaders in starting companies must exceptionally captivate their employees so that start-up can succeed in the realisation of innovative and considerably unexplored business intent and simultaneously compete with established competitive companies. Zäch and Baldegger (2017) claim that start-ups often have a very flat organisational structure with a low number of hierarchy levels and have mostly just one management level which is occupied by founder and leader in one person. Similarly, Vendetti (2010) introduces, that start-ups have a very simple organisational structure with authority centralised at the top of the hierarchy. According to Timmons and Spinelli (2008) in successful starting companies, democracy and groundless equality in the division of decision-making authority do not work and thus it is more suitable to clearly determine a leader, who possesses top authorities and responsibilities.

In a start-up, almost all strategic and tactical decisions are made by the founder and are mostly based on his intuition (Vendetti, 2010). The behaviour of leaders (founders) has, therefore, bigger, more direct impact on the performance of a start-up in comparison with bigger and running companies. This is confirmed by Kets DeVries and Miller (1986), who writes that individual attributes and behaviour of leaders influence the development and long-term sustainability of start-up. Equally, according to Hambrick and Mason (1984), start-ups are often perceived as a reflection of its top management. Timmons and Spinelli (2008) even claim, that in start-ups with big potential for growth, leaders are more important than technology.

Demonstration of tenacity and perseverance, reliability and honesty (Timmons, Spinelli, 2008) are the most important traits of a start-up entrepreneur appreciated by the investor. Butler (2017) states that business leaders are successful in an environment of uncertainty, motivated by risk, characterized by an extraordinary ability to convince and penetrating curiosity towards the external environment. Similarly, Bussgang (2017), as the most important leadership traits in the start-up states the ability to deal with uncertainty and shifting the boundaries of traditional business.

3.2 Team leadership in start-up

During the last several decades, researchers began to accept that leadership within organizations is not exclusively based on individuals (mostly CEOs) and top-down hierarchical leadership (Ensley, Hmieleski, Pearce, 2006). According to Timmons and Spinelli (2008), a success of a start-up is influenced not only by the strong leadership of founder, but it is also important to build a team whose members have skills, talents, and ability to work as a team that complements each other. Klotzet et al. (2014) state that most of the new enterprises are established and led by teams, not individuals. Pearce (2004) defines team leadership as current, lasting and mutual influencing of people and processes within a team, which is typical for its serial emergence of official and nonofficial leaders. Kiefer and Senge (1999) introduce that conversations in high-performing groups are not dominated by individuals designated as leaders, but rather by team members who possess the most relevant knowledge about a topic at the moment. In the practical application of team leadership, every member of a team is entitled to influence the action of other team members, and thus it cannot be clearly distinguished who is a leader and who is a follower (Pearce, 2004). Gronn (2002) describes this approach as *distributed* leadership, Pearce, Conger, and Locke (2008) talk about *shared* leadership, Kocolowski (2010) introduces the term *collective* leadership. In literature, the most commonly appearing term is team leadership.

Timmons and Spinelli (2008) state that start-ups with high growth potential are mostly built and led by a team, while unsuccessful start-ups with high potential growth are established by individuals mostly. Manz and Sims (1993) warn that teams with high performance do not have the structure of formal leadership. According to Kocolowski (2010), decision making authority and responsibility in conditions of team leadership are equally distributed to all team members. Team responsibility is thus based on the cooperation of the collective. Pearce and Sims (2002) found out that the application of team leadership allows companies to achieve better results in comparison with vertical leadership.

With the growth of a start-up, it is impossible for one leader to execute all functions and to carry all responsibility. Many good ideas will not turn into successful products because the founder is not capable and willing to share an idea, delegate authorities and create a team. Studies identify the inability of the founder to create a quality team and work within the team as one of the most common causes of start-up failure (CB Insights, 2016).

Real leadership encompasses both aspects of vertical and team leadership. Both types of leadership are considered an important condition of successful start-ups and also start-ups are considered an ideal context for their studies. Leader and team are considered an important condition for start-up existence, but it is not known dynamics of their development in small and quickly changing start-up and their impact on its performance, which would be

confirmed by quantitative evidence. Equally, the joint effect of model and team on business performance is not known, which could deepen knowledge on their synergic impacts.

4. Research sample and methods

Research sample and data collection. The survey was carried out in the first half of 2016, and the sample consists of 76 start-ups operating in the territory of Bratislava, where the largest start-up community in Slovakia is concentrated. Estimates of some governmental materials (Konceptcia, 2016) state that there are about 600 start-ups in Slovakia. The www.startitup.sk portal (STARTITUP, 2017) shows 301 start-ups. However, these figures are not based on official statistics, which do not record start-ups as a special category. According to the authors' estimates, about half of all the start-ups in Slovakia is concentrated in Bratislava and its surroundings. However, roughly one-third of all the start-ups do not make any obvious preparatory or business activity. Thus the research sample contains a significant number of start-ups operating in the over-developed EU region.

The sample of 76 start-ups was prepared in consultation with investors and representatives of co-working centres, incubators, and accelerators. The selection criterion was an investment by an angel investor or a minimal validation of the start-up on the market that would guarantee a minimum degree of start-up development and a higher probability of its existence during the research period. Each start-up was examined by one member of the research team who personally recorded evaluations and answers of the founder/owner to the closed and open questions in the questionnaire and immediately explained any ambiguities. Other sources of knowledge were interviews with team members, additional interviews as needed, publicly available information about studied start-ups from their websites, other websites, e. g. finstat, startitup, and professional journals, which also served for additional checks and corrections. The start-up staff also took part in the evaluation of the team leader and team. The research sample is narrowed due to data incompleteness in some cases to 72 start-ups (Table 1). For the purposes of statistical analysis (regression models), the sample was narrowed to 51 start-ups that meet the stringent features of start-up business making which are innovation, scalability, and rapid growth on international markets usually. This sample had a number of 50 to 45 start-ups (Table 4, Table 9, Table 10), because due to the combination of independent variables (business model, leadership, team) some start-ups had to be omitted for data incompleteness or did not meet regression analysis conditions.

Start-ups from the narrowed sample do business according to SK NACE (2016) in industries of Information and Communication (29.9 %), Administrative and Support Services (26.6 %), Industrial Production (17.7 %), Arts, Entertainment and Recreation (12.2 %), Wholesale and retail trade (6.8 %), Financial and insurance activities (6.8 %). Start-ups usually know their competitors, but their current effort is devoted to the increasing number of users and converting them to customers. Competition is still too weak or remote, the start-up is often below its distinguishing level, and therefore the business model is not yet influenced by competitive forces.

The leading person (founder and owner) of the start-up is 28 years old on average and has a 2nd degree university education. Before establishing the start-up and starting an independent business making, the founder was an employee in the period of 7.5 years. The average number of team members in the surveyed period was 6.25, and the average start-up existence was 29 months. The founders had financial resources ranging from 50,000 to 200,000 euros, which should cover approximately a year's start-up operation. The highest cost item was wages (44.5%).

Variables. For the description and analysis of business models, there was chosen *canvas* methodology by Osterwalder and Pigneur (2009, pp. 15-44). Among the available models (Slávik, 2011), the canvas is the most comprehensive. It captures the economic side of business making through revenue flows and costs; it records where costs are consumed and revenues generated. It describes a value the enterprise creates for the customer. The chosen method of visualization allows effectively explore a particular business and formulate a particular

business model. The main blocks of the model are Customer value propositions, Customer segments, Customer relations, Distribution channels, Key partners, Key activities, Key resources, Cost structure and Revenue streams. The concept of vertical and horizontal leadership was chosen to describe and analyse leadership and teamwork. Selected questionnaire statements made by Cox (1994) were used. The double format of this questionnaire designated to measure the vertical versus team leadership was successfully used in the survey of Ensley, Hmieleski, and Pearce (2006).

The independent variables describing the degree of development of blocks of the business model based on the *canvas* method are listed in Table 4 (thirteen variables). The block of Customer Value Propositions is described by two variables, and the block of Customer Segments is described by three variables. Independent variables also include two determinants of business performance Notion about a negotiated price and Notion about a volume sold which, in the author's opinion, extends consideration of factors affecting performance and can contribute to its more accurate determination. The bipolar interval scale (Gavora, 2012, pp. 62, 63) was used to measure the variables. This scale evaluates the different degree of one trait of the studied subject. Rating 1 on the 5-point scale means "no functionality" and rating 5 means "full functionality." *The degree of development of a business model block* is measured on a scale of: 1 - no, 2 - basic concept, 3 - complete concept, 4 – attempts with implementation, 5 - complete or almost complete functionality. The content validity of the scale is ensured using the canvas research tool and discreetly formulated stages of development.

Independent variables describing the degree of development (quality) of leadership are listed in Tables 9, and 10 (four variables), and the degree of development (quality) of the team are shown in Tables 9 and 10 (six variables). The bipolar interval scale (Gavora, 2012, p. 63) was again used to measure the variables. Rating 1 on a 5-point scale means "minimal quality" and rating 5 means "excellent quality." *The quality of the leader and teamwork* is measured on a scale of: 1 - minimum, 2 - low, 3 - sufficient (however it could be better), 4 - satisfying (but there are still some reserves), 5 - brilliant.

Dependent variables measuring business performance of start-up are listed in Tables 4, 9 and 10 (three variables). Performance of start-up is measured by the number of users, the number of paying users (customers) and the revenues. The unipolar interval scale (Gavora, 2012, p. 63) was used to measure the variables. Rating 1 on the 5-point scale means "no performance" and rating 5 means "max performance." *The number of users and the number of paying users (customers)* are measured on the scale of: 1 - none, 2 - several, 3 - several tens, 4 - several hundreds, 5 - several thousand or more. *Revenues* are measured on the scale of: 1 - none, 2 - cover current costs from 0 to 25 %, 3 - cover current costs from 25 to 75 %, 4 - cover current costs from 75 to 100 %, 5 - also bring profit. Reliability of the scales of variables is confirmed by the Cronbach's alpha (min. 0.6 and above), which is recorded in Tables 4, 9 and 10.

The analytical procedure consists of descriptive statistics and regression models. Descriptive statistics describes the business model, leadership, and teamwork through the average values of their traits, frequencies, and shares of the whole. It provides a comprehensive and more detailed picture of the basic features of the research sample: distribution of start-ups depending on the business idea development, identification of the degree of development of the business model depending on the development of the business idea, performance of a start-up depending on the development of the business idea, the quality of the leadership structure (vertical leadership) and teamwork (horizontal leadership) depending on the development of the business idea. Developmental phases of a start-up (its business model) are recorded on *the scale of business idea development (business cycle)*: 1 - idea/concept/research, 2 - product development, 3 - product prototype/testing, 4 - minimum viable product/first revenues, 5 - verified product/growing revenues.

Regression models investigate causal links based on multiple linear regression that measure the impact of the business model, leaders, and team on selected start-up performance indicators. The influence of the independent

variables is compared to identify independent variables that have a significant effect on the dependent variable being studied. Model is gradually modified so that it can have such a structure which can explain researched variable in the best way. For this reason, there were removed variables with lowest and statistically nonsignificant impact, and concurrently condition for the growth of determinant coefficient must have been met. Expressing ability of the model in case of one explanatory variable was assessed by means of the determinant coefficient and in case of several variables by means of the modified coefficient of determination. For statistically significant there is considered level $p < 0.05$.

5. Results of research

5.1 Structure of business model of a start-up in a cycle of business idea development and impact of the business model on start-up performance

Research documented variables of the business model in the development cycle of a business idea. Imperfection, defectiveness or malfunction of business model is considered to be the main reason for start-up failure. Research should show how start-up, displayed by means of visualisation of blocks of business model, develops and changes. Business model with gradual phases of development of business idea increases degree of its development, however from Table 1 it is clear that even in first phase it is relatively developed (it is close to compact concept), and progress to final phase does not represent even 1,5 value point (slightly above attempts for realisation), or progress between phases one and five is only 33,3 %, if 4,24 is 100 %, even in phase 2 there is a slight decrease in the degree of model development and increase between phases 4 and 5 is minimal. According to number of start-ups, there are however for research crucial phases 3, 4 and 5. In the first two phases, there is only 15.3 % of the research sample.

Table 1. Average degree of business model development in particular phases of business idea development

Phase of business idea development	1	2	3	4	5
Degree of business model development	2.83	2.58	3.32	4.16	4.24
Number of start-ups (together 72)	3	8	20	23	18
Share of start-us (%)	4.16	11.11	27.77	32.85	25.0

Source: authors

Development tendencies of business model blocks (Table 2) are a decrease in assessment in 2nd phase apart from relations with customers, then mainly growing tendencies in next phases, however in the final 5th phase there are recorded small decreases (it is obviously a symptom of uncertainty, that development is coming to its end and feedback from reality revises assessment) or only small increases in comparison with previous phase.

Based on date from the Table 2 it is clear that the most elaborated is value for the customer, revenue streams belong to less developed. The discrepancy is obvious; it does not get on well to monetize the customer value proposition. This could have several reasons. Offered value is attractive. However customer does not want to pay because there is no suitable model of incomes/payments created for him, or value is attractive, but for another type of customer, or it is delivered to the customer in an incorrect way, e. g. too early or too late, on the incorrect place, distribution channel does not work, there is lack/plenty of customers and price is too low (value does not earn) or too high (value discourages). Unmissable knowledge from table data is that start-ups try to proceed autonomously and they consider the building of partner relationships less important.

Table 2. Structure of business model in the business idea cycle

Degree of development of business model blocks	Phase of business idea development				
	1	2	3	4	5
Customer value proposition	3.00	3.00	3.78	4.57	4.61
Customer segments	3.55	2.96	3.55	4.38	4.15
Distribution channels	3.00	2.13	3.15	3.96	4.17
Customer relationships	1.67	2.75	3.40	4.30	4.39
Key activities	3.00	2.63	3.40	4.09	4.33
Key resources	3.00	2.75	3.45	4.35	4.33
Key partners	3.33	2.5	3.40	3.65	3.72
Revenue streams	2.20	1.85	2.31	3.52	4.11
Cost structure	2.67	2.63	3.45	4.61	4.39

Source: authors

Total picture about metamorphoses of the business model and its impact on performance is recorded in Table 3. Performance indicators in the business idea cycle from phase 1 to phase 3 (prototype of product/testing) show decrease. Not even in the final phase of its development, in phase five, start-ups do not make a profit (*4 – cover present expenses from 75 to 100 %*).

Table 3. Business performance of start-up in business idea cycle

Performance indicators of start-up	Phase of business idea development				
	1	2	3	4	5
Number of users	2.00	1.75	2.80	3.52	3.94
Number of paying users/customers	1.67	1.25	1.65	3.09	3.78
Revenues	2.33	1.63	1.25	2.87	3.78

Source: authors

In the beginning, regression analysis examines the relationship between all blocks of the business model and its performance, expressed in terms of *number of users, number of customers and revenues* (Table 4). After the gradual modification of the regression model, there are identified blocks which have a statistically important impact on performance indicators. Identified blocks together and significantly affect performance, although the performance of specific start-ups can be affected by other significant blocks. The number of users is influenced the most significantly by *distribution channels*, and *geographical radius*, followed by *knowledge of needs, partners, notion about sold volume*, and closely below the significance level is placed *cost structure*. These variables together explain 45 % variability of number of users. The number of users depends significantly on the degree of development of the distribution channels and the extent of the territorial activity of a start-up. An important influence is also the knowledge of the needs thus a cognition of a problem of a potential customer and its solution. The partners and the notion about a sold volume have a negative impact on number of users. These factors seem to cause limitations and weaken creativity. Start-up is still looking for customers and a market place, and so overly binding goals/notions and other interests of a partner can limit it in potential growth. A higher level of development and knowledge of the cost structure is also a feature of start-up, which can contribute to more efficient use of resources to acquire users.

Presence on the market in the sense of right geographical location is important for a start-up which develops an application with use in the world of fashion because Slovak market is small even unsuitable for this type of product. Very soon after its emergence, it moved from Slovakia to Italian Milan so it would be close to relevant

customers, which are fashion houses and brands with leading fashion trends and where this developed product might be needed. Another start-up that produces stylish furniture and toys for children went towards purchasers on international markets. Original products were sold only on the local market, they were too big and could not be folded with the aim of simpler transfer, but customers could pick them up in person. New products were already designed to be folded for transport size and easily delivered abroad. Fast transition to international markets is crucial for start-ups developing mobile applications. They must obtain a large amount of users and thus the local market is very small for them.

Table 4. Impact of business model blocks on the performance of start-up which is expressed by number of users, number of paying users/customers and revenues

Blocks of business model	Users		Paying users/customers		Revenues	
Customer value proposition	0.39	0.42*	0.06		-0.01	
a) Knowledge of needs	(0.25)	(0.18)	(0.28)		(0.28)	
Customer value proposition	-0.13		0.14		0.21	
b) Degree of product development	(0.34)		(0.38)		(0.38)	
Customer segments	0.44		-0.47	-0.51+	-0.48	
a) Identification of customers	(0.32)		(0.35)	(0.26)	(0.36)	
Customer segments	0.04		0.44	0.58**	0.41	0.58**
b) Market presence	(0.26)		(0.29)	(0.21)	(0.29)	(0.16)
Customer segments	0.30*	0.30**	0.08		-0.05	
c) geographical radius	(0.13)	(0.11)	(0.15)		(0.15)	
Distribution channels	0.68**	0.66**	0.10		-0.05	
	(0.21)	(0.17)	(0.23)		(0.24)	
Customer relationships	0.09		-0.09		0.05	
	(0.26)		(0.29)		(0.30)	
Key resources	-0.14		-0.03		-0.01	
	(0.27)		(0.30)		(0.31)	
Key activities	-0.39		-0.27		0.13	
	(0.33)		(0.37)		(0.38)	
Partners	-0.33*	-0.30*	-0.19		-0.16	
	(0.16)	(0.14)	(0.17)		(0.18)	
Notion about a negotiated price	0.11		0.39	0.41*	0.11	
	(0.27)		(0.29)	(0.17)	(0.30)	
Notion about a sold volume	-0.42*	-0.38*	0.17		0.13	
	(0.18)	(0.16)	(0.20)		(0.21)	
Cost structure	0.29	0.28+	0.16		0.25	
	(0.19)	(0.16)	(0.21)		(0.21)	
R ²	0.57	0.52	0.41	0.31	0.33	0.22
R ² adjusted	0.41	0.45	0.19	0.27	0.08	0.21
F	3.54	7.52	1.84	7.15	1.33	13.96
Cronbach's alpha	0.90	0.72	0.90	0.77	0.90	N/A
N	48	48	48	50	48	50
<i>Level of significance +0,1 *0,05 **0,01</i>						
<i>Standard error in parenthesis</i>						

Source: authors

The number of paying users/customers is most influenced by the *market presence* and *notion about a negotiated price*, closely below the significance level there is impacting *identification of customers*. These variables together explain 27 % variability of the number of customers. Start-up, which wants to convert users to customers, has to increase its market presence (product validation, product awareness, promotion, etc.) and penetrate the market with its product. This is also helped by setting the right price, which will increase the number of customers and provide feedback for further progress. Targeting a particular group of customers has a negative consequence for

the number of customers. When converting users to customers, customers are down, and due to their sensitivity to product price, the customer's nature may change significantly, or new customers whose start-up does not address its product may emerge.

A start-up that develops internet applications spotted an opportunity based on a need it felt as insufficiently satisfied and verified its purpose with customers. He assembled a set of metrics, which watched the impact of improvement of the application on user satisfaction. Start-up which created presentation software states that until it gains paying customers, it cannot identify the needs of customers perfectly. Not users, but their payments confirm knowledge of needs or solved problems. In average start-ups know needs of customers very well because they carry out trials with verification of their fulfilment. The most often declared value for the customer is novelty, design, comfort or decreased costs.

Revenues are exclusively influenced by *market presence*, which explains 21 % of their variability. Sufficiently developed awareness about the product, brand, and enterprise, quick and easy product availability that accompanies rapid market penetration will be reflected in first and repeated purchases and rising revenues. Feedback impact on product upgrading and customer attachment is also enhanced.

To persuade customers to buy and pay for products is the biggest issue, task and weakness of studied start-ups. Challenge of research is to find the answer to question "How to realize revenues and earn?" on the base of the practice of successful start-ups. Actual knowledge/examples of failures of entering markets and insufficient monetization are these:

- * after finalisation of product development and first attempts to enter a market it has been proven that product fits customer, but customer is sceptic, not very solvent, to negotiate with customer there is needed trustworthy representative, possibly product should be categorised such as a health aid and institutions (health insurance company, association of disabled people) should be involved into dissemination, customer must be addressed, visited in person, product must be tried out and accustomed to it in their home environment where user feel comfortable, has good space orientation. Sale will not get off the ground without development of selling technique adapted for disabled customer, market of disabled customers is small in particular countries (tens of thousands of people), there is a need to focus on countries which have hundred of millions and more citizens,
- * start-up does not have to acquire customers yet, investors want start-up to collect users in order for customers to get used to using application which provides them with unusual and comfort satisfying their needs, scale-ability of users is its priority, monetization is still not on a programme of a day, the goal is to create mass of users, premature monetization slows development and growth of start-up,
- * start-up silently works on sophisticated application, which is liked by domestic customers, but they predicted to buy in a year or two, a change was brought by participation on important international fair, launch of product has brought international response and immediate interest of customers and investors,
- * start-up does not have to know how and experience how to penetrate international market, even though international acceptance of product is crucial for its growth, viability, and success. The product is developed, tried out, has its first customers, but it is not enough. Random meeting of an investor with similar international company brings desired an international partner with great knowledge of the market with products for HRM and own concept of seeking suitable candidates for work place, joining of modified Slovak product and foreign distribution is a strong impulse for further growth.

All monitored start-ups stand in front of a task to scale rapidly. Small domestic market prevents them from scaling; lack of experience regarding entering foreign market, mostly these are markets of several countries; unfamiliarity with penetration into existing distribution channels, mostly it is unfamiliarity of how to build own distributional channel; distribution of e-apps is less demanding than distribution of hardware, first entering of market is usually entering international market, cyberspace has unclear national borders. Skilled and experienced foreign partner/entrepreneur helps to overcome lack of knowledge about the foreign market and entrance into the

foreign market. He brings know-how and contacts, or he is an executive trade representative placed directly abroad. Uncomfortable experience is competitors whose start-up spots only after entering the market.

5.2 Structure of start-up leadership in business idea development cycle and impact of leadership on start-up performance

Vertical leadership is obvious especially in the early phases of development of business idea (Table 5). In the early stages of the business idea, the driving force of start-up is the enthusiasm of founder, inspiration, and motivation of other co-workers. This effect of a leader in other phases of start-up decreases. Research confirmed the decreasing importance of vertical leadership in relation to start-up development with the exception of the final phase, where the importance of vertical leadership increases again. Even in the final phase, the level of leadership is higher than in the early stages of development of the business idea. Vertical leadership is expressed by four variables (Table 6). Start-up establishers expressed themselves as outstanding visionaries, but they devote less effort to the development of competencies of their co-workers in the form of education, coaching or mentoring.

Table 5. Vertical leadership and business idea development

	Phase of business idea development				
	1.	2.	3.	4.	5.
Vertical leadership	-	4.05	3.87	3.49	4.38
Number of start-ups (together 76)	0	8	27	22	19
Share of start-ups (%)	0	10.53	35.53	28.94	25.00

Source: authors

Table 6. Variables of vertical leadership and phases of business idea development

Variables of vertical leadership	Phase of business idea development				
	1.	2.	3.	4.	5.
Creation of vision	-	4.60	3.78	4.00	4.62
Inspiration of fellow workers	-	4.20	3.67	3.93	4.46
Encouragement of fellow workers	-	4.20	3.39	3.87	4.46
Competency development of fellow workers	-	3.20	3.11	3.67	4.00

Source: authors

On the contrary to vertical leadership importance of team leadership with the development of start-up grows (Table 7). If the start-up progresses, it is extremely difficult for a leader to manage all tasks and carry all responsibilities, and hence it increases the importance of team leadership. Quality of team leadership is described by seven criteria (Table 8). Research showed that quality of relationships in start-up team is given especially by coherence, mutual support, and trust of team members. These aspects of team work were assessed as highest amongst criteria of team leadership. Formal and informal division of labour and roles, on the contrary, got the lowest assessment.

Table 7. Team leadership and business idea development

	Phase of business idea development				
	1.	2.	3.	4.	5.
Team leadership	-	3.86	4.11	4.29	4.57
Number of start-ups (together 76)	0	8	27	22	19
Share of start-ups (%)	0	10.53	35.53	28.94	25.00

Source: authors

Table 8. Variables of team leadership and phases of business idea development

Variables of team leadership	Phase of business idea development				
	1.	2.	3.	4.	5.
Cohesion	-	3.33	3.92	4.19	5.00
Mutual support	-	3.33	3.88	4.38	5.00
Division of roles	-	3.50	3.58	4.00	3.50
Division of labour	-	3.33	3.69	4.06	3.00
Cooperation	-	3.00	3.96	4.00	4.50
Creativity	-	3.50	4.00	3.88	4.50
Individual initiative	-	3.17	3.96	4.25	4.50

Source: authors

Vertical and team leadership makes sense when it positively influences the business performance of a start-up (Table 9). Among the investigated parameters of both vertical and team leadership, the leader and his *competence development of fellow workers* and *individual initiative* of team members positively influence the number of users. Together, they explain 12 % variability of the number of users. *Mutual support* and confidence of team members in unpleasant, unpredictable and crisis situations has a positive impact and *division of labour (formal)* has a negative impact on the start-up performance expressed by the number of paying users. Both variables together explain 18 % variability of the number of customers. The size of revenues is not sensitive to any leadership or teamwork parameter.

Uncomfortable, unpredictable and crises situations represent especially lack of money in early stages of start-up, payment of symbolic wages to members of the team because it is being invested into next development of business, extraordinary work effort, frequent departures and exchanges of the team. An example is a start-up which develops software, web solutions and provides consultations in IT. Overtimes in early stages of business cannot be counted by team members. Sometimes they worked 12 hours a day and also during weekends. The behaviour of people during crises situations is, however, the best predictor of their future behaviour and performance.

Mutual support of team members in unpredictable and crises situations have appeared in a start-up which provides services of electronic mail. All five members of the start-up team were having fun at work party playing bowling when around midnight the leader received a phone call announcing that the main server stopped working and hence the application was completely dysfunctional. The whole team returned back to work, and all worked till early morning hours to fix the defect. Start-up leader stated that he did not have to persuade or force anyone, everybody realised the seriousness of the situation and proved their responsible approach to work and that they support each other.

Table 9. Impact of leadership and team on the performance of start-up

Variable		Users		Paying users/customers		Revenues	
Leader	Creation of vision	-0.64 (0.38)	-0.51 (0.34)	-0.05 (0.35)		-0.22 (0.36)	
	Inspiration of fellow workers	0.21 (0.33)		0.39 (0.31)		-0.05 (0.31)	
	Encouragement of fellow workers	0.02 (0.36)		-0.08 (0.33)		0.23 (0.34)	
	Competence development of fellow workers	0.36 (0.31)	0.47 ⁺ (0.27)	-0.13 (0.29)		0.00 (0.29)	
Team	Mutual support	0.47		0.76 ⁺	0.85 ^{**}	0.59	

		(0.43)		(0.40)	(0.27)	(0.41)	
	Division of roles (informal)	-0.12 (0.24)		0.04 (0.22)		0.19 (0.22)	
	Division of labour (formal)	-0.06 (0.26)		-0.63* (0.24)	-0.55** (0.20)	-0.30 (0.24)	
	Cooperation	-0.45 (0.39)		0.14 (0.36)		0.43 (0.37)	
	Creativity	-0.33 (0.31)	-0.42 (0.29)	-0.01 (0.29)		0.11 (0.30)	
	Individual initiative	0.48 (0.37)	0.52* (0.28)	0.07 (0.34)		-0.52 (0.35)	
	R ²	0.25	0.20	0.26	0.21	0.16	
	R ² adjusted	0.05	0.12	0.06	0.18	-0.06	
	F	1.22	2.62	1.28	6.05	0.73	
	Cronbach's alpha	0.79	0.62	0.79	0.61	0.79	
	N	47	47	47	47	47	
Level of significance +0.1, *0.05, **0.01 Standard error in parenthesis							

Source: authors

The formal division of labour (duties) and roles within a start-up team achieved not only the lowest average point assessment among parameters of team leadership (tab. 8), but it was also proven that formal division of labour has a negative impact on start-up performance, especially on the number of paying customers (tab. 9). Start-up teams consist mainly of very universal individuals. Start-up founders do not seek their co-workers in ordinary workplaces, but they choose freelancers (independent professionals without permanent employment) with previous experience in dealing with start-up projects. Universal people are an advantage for a start-up because they can cover a number of jobs for the same salary. Moreover, in the first months of their functioning, the composition of start-up teams is changing frequently, therefore start-ups need universal people who can take over responsibilities and tasks for a member who left.

5.3 Joint impact of business model and team on start-up performance

Results of analysis of the joint impact of business model, leader and team on performance indicators of start-ups are displayed in Table 10. The number of users is statistically significantly impacted by *distribution channels*, *relationship with customers*, *key partners* and *formal division of labour*. They explain together 36 % variability of number of users. Number of paying customers is statistically significantly impacted by *market presence*, *mutual support in the team* and *formal division of labour*. They explain together 32 % variability of number of users. Revenues are statistically significantly impacted by the *market presence*, *informal division of roles* and *formal division of labour*. Together, they explain 22 % variability of revenues.

Table 10. Impact of business model and team on performance of start-up

	Variable	Users		Paying users/customers		Revenues	
Model	Customer value proposition	-0.09		-0.38	-0.31	-0.80	-0.35
	a) Knowledge of needs	(0.49)		(0.54)	(0.27)	(0.51)	(0.28)
	Customer value proposition	-0.08		0.00		0.60	
	b) Degree of product development	(0.49)		(0.53)		(0.51)	
	Customer segments	0.84		-0.04		-0.45	
	a) Identification of customers	(0.58)		(0.64)		(0.61)	
Customer segments	-0.02		0.43	0.38+	0.53	0.54*	
b) Market presence	(0.33)		(0.36)	(0.21)	(0.35)	(0.20)	

	Customer segments	0.31		0.01		-0.20	
	c) geographical radius	(0.19)		(0.21)		(0.20)	
	Distribution channels	0.87*	0.89**	0.11		-0.18	
		(0.33)	(0.21)	(0.36)		(0.35)	
	Customer relationships	0.62	0.46*	0.53	0.44	0.83	0.43
		(0.48)	(0.22)	(0.53)	(0.27)	(0.50)	(0.28)
	Key resources	-0.20		-0.02		-0.16	
		(0.38)		(0.42)		(0.40)	
	Key activities	-0.24		-0.38		0.11	
		(0.47)		(0.52)		(0.49)	
Partners	-0.50*	-0.40*	-0.21		-0.24		
	(0.23)	(0.17)	(0.26)		(0.24)		
Notion about a negotiated price	-0.23		0.13		0.40		
	(0.43)		(0.47)		(0.45)		
Notion about a sold volume	-0.42	-0.43*	0.20		-0.18		
	(0.29)	(0.19)	(0.31)		(0.30)		
Cost structure	0.12		0.08		0.20		
	(0.25)		(0.28)		(0.26)		
Leader	Creation of vision	-0.57		-0.02		-0.19	
		(0.52)		(0.57)		(0.54)	
	Inspiration of fellow workers	0.55		0.45	0.30	-0.04	
		(0.45)		(0.50)	(0.23)	(0.47)	
Encouragement of fellow workers	-0.33		-0.43		0.10		
	(0.45)		(0.50)		(0.47)		
Competency development of fellow workers	-0.14		-0.03		-0.14		
	(0.36)		(0.39)		(0.37)		
Team	Mutual support	0.27		0.60	0.64*	1.13+	
		(0.57)		(0.63)	(0.28)	(0.60)	
	Division of roles (informal)	0.03		0.16		0.51	0.35+
		(0.28)		(0.31)		(0.30)	(0.19)
	Division of labour (formal)	-0.41	-0.20	-0.74+	-0.76**	-0.55	-0.37+
		(0.38)	(0.18)	(0.42)	(0.21)	(0.40)	(0.21)
Cooperation	-0.38		0.02		-0.13		
	(0.41)		(0.45)		(0.43)		
Creativity	0.20		0.15		0.38		
	(0.36)		(0.39)		(0.37)		
Individual initiative	0.11		-0.12		-0.95*		
	(0.38)		(0.42)		(0.40)		
	R ²	0.64	0.43	0.50	0.40	0.52	0.30
	R ² adjusted	0.27	0.36	-0.01	0.32	0.02	0.22
	F	1.73	6.01	0.98	4.65	1.05	3.58
	Cronbach's alpha	0.89	0.74	0.89	0.73	0.89	0.69
	N	45	45	45	47	45	47
<i>Level of significance +0.1, *0.05, **0.01</i>							
<i>Standard error in parenthesis</i>							

Source: authors

The result of the analysis is finding, that performance of start-ups is jointly influenced by hard (model) and soft factors (leaders and team). Among factors of business model, there are mainly visible relationships with customers impacting all performance indicators (however customers and revenues without appropriate significance) and market presence influencing number of paying users and revenues. Amongst the team factors, it is a formal division of labour. However, the formal division of labour has a significantly negative impact on performance, and thus it is possible to conclude that for a start-up there is not a suitable formal division of labour.

Formalisation may bring more transparency into start-up but at the same time decreases its performance. Leadership itself (vertical) has only a very small impact on performance, the inspirational impact of a leader on a number of users (however without appropriate significance again) is attracting attention only.

To simply judge the degree of model impact, leader and team on start-up performance there might be applied a relative indicator, which will have a number of relevant regressions in numerator and number of all measured regressions in the denominator. Model/leader/team has an impact on number of users 0,17/0,0/0,0, model/leader/team has an impact on number of paying users 0,04/0,0/0,09, model/leader/team has an impact on revenues 0,04/0,0/0,09. It is clear that the model has a higher impact on number of users than team, team more influences number of customers and revenues than model and impact of a leader is almost neglect-able.

Based on regression analyses it was confirmed the impact of model and team on start-up performance on statistical level of importance $p < 0.05$. Components (factors) of model and team impacted on various performance indicators, while their joint impact was identified only on the level of importance $p < 0.1$. It is possible to conclude that different combination of soft and hard factors impact on different performance indicators of an enterprise.

6. Discussion

Description of the business model.

Out of all blocks of business model, the most developed is value for the customer, followed by similarly developed blocks of customer segment, relationship with customers, processes, and resources, the structure of expenses, less developed blocks are distribution channels and partners, the least developed is a block of revenues. It could be concluded that start-ups know what does a customer need, they know a customer, in case they can reach him they can serve him. Then, resources and processes are little less developed, but start-ups face a problem of getting to the customer and earning money, while not paying adequate attention to creating a partner relationship. The business model is being gradually homogenised.

Inadequate development of business model blocks leads to risk of the next progress of start-up. A. Maurya (2012, p. 25) states that business model blocks should be developed concurrently and together, especially blocks connected with product and customers. Excessive orientation on product or value and forgetting customer can get a start-up into a situation where it has its product finished, but customers will not be interested in it. Unbalanced development of business model blocks can be explained via imperfection of start-up as very small, inexperienced and hence imperfect enterprise, which learns by the method of trials and fails, acts opportunistically, its resources are incomplete when it usually has only one valuable resource, which is represented by the business idea. This is not a mistake, it is a natural state, which strongly implicates high level of failure.

Impact of the business model on start-up performance.

Impact of the model on performance was confirmed by regression analysis, however statistically important impact had several of model blocks only. In regards to start-ups being in development, identified blocks do not have to be definitive. Performance expressed by number of users, customers and revenues can be impacted by the presence on a market, distribution channels, knowledge of needs and key processes. While descriptive analysis reveals the level of development of model blocks, so regression analysis measures its impact on performance. Not all developed blocks have a simultaneously relevant impact on performance. The evident discrepancy is between the level of distribution (low) and its impact on enterprise performance (relevant). Somewhere here, there is a weak place of studied business models or simply said their inherent characteristic. Progress in business idea development and collecting capital necessary for operation significantly impact on start-up performance too. Impact of business model blocks on start-up performance is considerably inconsistent and again can be explained by imperfections of start-up and especially its opportunistic action. Start-uppers only deal with topics and problems when they come into existence, and they do not have work capacity or enough experience to build and

manage a start-up as a mature enterprise. On the other hand, identified pertinences, e. g. impact of presence on the market on number of users and paying customers could be those factors, which have to be monitored systematically in the long term in achieving of business performance.

Description of vertical and team leadership.

Vertical leadership in start-ups is evident mainly in the early stages of business idea development. Start-up founders have proven themselves as expressive visionaries, but less effort is devoted to the development of competences of their co-workers. Contrary to vertical leadership meaning of team leadership with the progress of start-up grows. Amongst researched parameters of vertical and team leadership positively impact on business performance of start-up especially mutual support and trust of team members in uncomfortable, unpredictable and crises situations. The formal division of labour (responsibilities) and informal division of labour in start-up team achieved not only lowest point in assessment out of all parameters of team leadership but concurrently proved that formal division of labour has a negative impact on start-up performance, mainly on number of paying users. Strict determination of responsibilities and duties brings more negatives than positives, weakens creativity and innovativeness. Founders and leading people in start-ups are more leaders than managers. They can inspire and ignite enthusiasm in their surroundings, but with the progress of start-up, enthusiasm starts to disappear, and it is not substituted by quality managerial work. Founders do not devote sufficient time to professional development of their co-workers, formal division of work is counterproductive, and the importance of team leadership grows, which can work without a leader. At the end of the start-up development role of vertical leadership grows, because it is approaching the "final countdown," but it still cannot divert deceleration of business model development. Start-up as an imperfect enterprise probably prefers more informal management.

Impact of vertical and team leadership on start-up performance.

Leadership has only had a minimal statistically significant impact on start-up performance. Interviews and case studies, however, show the leader's ability to encourage other team members in case of problems, complications, and failure. Start-ups usually transfer from failure to failure, try to learn a lesson from every loss and investigate why the repeatable business model with high growth does not work. Stamina, dauntless passion, and the ability of a leader to go on even after failure and to learn from it, get even bigger meaning in start-ups than in standard companies. Most of the start-up teams must get over unsuccessful projects, which can enrich them more than successful ones. Typical start-up comes across difficult challenges, e.g. unknowingness of industry, lack of finances, sudden and fast leaving of team members and others. People in the team are profiling in the long term; sometimes they have doubts and they loose trust, hence the ability of a leader to encourage team members in darkness and on the brink of desperation is a fatal necessity. Even though literature devotes to leader encouragement only small attention, this activity gains greater importance in a start-up than a traditional company.

The parallel impact of business model and team on the start-up performance.

Concurrent impact of business model and start-up team influences start-up performance, while there was identified the relatively isolated impact of various parameters of model and team on different performance indicators. In the beginning when start-up forms its business concept and hence customer feedback is important, it is the role of distribution channels and relationship with customers to obtain this feedback so that offered value, revenue streams and other blocks of business model could accommodate to customer needs. At the same time, in this phase the start-up is interested in maintaining certain autonomy in relation to partners, in order to maintain the possibility of unexpected change or pivot in the early phase. The higher expectations and requirements on performance the more team work gets to the front. Start-up development in higher phases of business idea realisation requires more complex and formal division of work, but the condition of maintaining creative and flexible environment are of more informal and freer structures, which appeal as motivational too.

In early phases of development, start-ups attempt to obtain as many customers as possible, but according to Ries (201, pp. 20, 21) they are still seeking concept, and the key factor is feedback from users. Research results show that it is advantageous to concentrate on distribution channels and building relationship with customers, while other monitored factors of business model do not have an unambiguous impact. Partners and notion about quantity have a negative impact, which might be caused by excessive expectation and limitation from partners and in case of notion about quantity by an aversion to the revision of business model. Partners cooperating to get returned service may prefer short-term benefit before a remoted goal or return to a phase of concept seeking. Start-up which has a notion about sold volume does not have to be inclined to an experiment with the model and hence can give up the alternative business model when it acts regarding the psychological concept of aversion to loss, according to which it appreciates more current and real result than future and predicted the result.

Unless start-up strives only for quantity, but it strives to achieve a higher level of its viability, its performance is mostly influenced by team factors. The subject of improvement in business making is not an idea anymore, but the improvement of the business model. Mutual cohesion in the team is a symptom to overcome obstacles and difficult times, which can lead to team breaking up. Elaboration of a business plan can contribute to the solution of conflicts and achievement of higher performance (Dollinger, 2008, pp. 159, 160). In rapid development of the business, formal division of labour is reflected negatively in performance indicators. The formal division of roles may restrict creativity and flexibility. The formal division of labour negatively impacts friendly atmosphere and enthusiasm, which are a stronger motive for higher performance than the daydream of future incomes.

In an indicator of revenues, there is hidden another level of start-up development and its ability to function independently. While the level of market penetration is intuitively understandable, the negative impact of formal division of labour and the positive impact of the informal division of labour might be observed again. A possible explanation is similar to one with number of paying users. The formal division of labour may restrict the creativity of team members, because they are confronted with their duties and have less working freedom, lowered flexibility, because the job is not performed by anyone, but by the selected employee, possibly to limit friendly atmosphere, which less motivates team members. Concurrent/combined activity of business model, leader and team impacts on start-up performance in other structure and number of relevant effects than when effects of model, leader, and team are researched independently (Table 11). In the concurrent activity of factors, there are appearing the effects that are not relevant independently, or the effects are losing that are relevant separately. In particular, the business model loses its own and combined effect in the course of conversion from users, through customers to revenues. In addition, the impact of business model blocks and individual leadership and team traits is not stable during the conversion. Some impacts disappear, others arise. In an interplay of factors, the impact of the model is diminished, and team impact is activated. If this knowledge is transposed into practical management, this means that the start-up performance can be increased by a deliberate improvement and coordination of business model, leadership, and teamwork, or at least to concentrate on more quality control of important factors.

Table 11. Relevant impacts of business model, leadership, and team on the performance of start-up

Relevant impacts	Performance indicator (Number of significant impacts)		
	Number of users	Number of paying users/customers	Revenues
Business model	5 + 1 ⁺	2 + 1 ⁺	1
Leader	1 ⁺	0	0
Team	1 ⁺	2	0
Model - leader - team	4 - 0 - 0	1 ⁺ - 0 - 2	1 - 0 - 2 ⁺

*1⁺: Level of significance is +0.1, otherwise: *0.05 or **0.01*

Source: authors

Conclusions

Start-ups are distinctively captivated and concentrated on value for the customer, relatively significantly perceive a customer and have processes that bring results. Less effective/functional are relations with customers, the structure of expenses and resources. Significantly weaker are distribution channels, and key partners show minimal impact/importance. Start-ups cooperate with partners very rarely, which is a significant finding, because as a very small enterprise they have limited resources, they dispose with limited volume, diversity, and quality of their own valuable resources. Key partners are an essential accessory to limited tangible and intangible resources. Even though start-ups know the value for customer and customer themselves, but they do not know how to get to him due to less functional distribution channels, and they cannot tie him due to less functional customer relationships. Value for customer and customer himself are the entrance to prosperity, but the key for it is distribution channels and relationship with customers.

Impact and effect of business model and team on start-up viability which is measured by its performance were confirmed but a number of relevant factors is not too high, and performance indicators are not influenced by completely identical factors. In the total impact of the model, team and leadership there enter to the fore the only relationship with customers, presence on a market as positive factors, formal division of work as negative impact and role of leadership disappears. Despite this, it might be concluded that for the success of start-ups, which are absorbed in themselves and their ideas, it is inevitable to cultivate intensive knowledge of the customer, not to postpone entrance on a market until the product is completely finalised and maintain informal relationships within a start-up. Leadership in structure as it was examined, means no advantage for start-ups, which might be considered as surprising finding.

Young founders cannot overcome lack of entrepreneurial practice they obtained over the short existence of studied start-ups. The external world is out of their power; they cannot orient in it, they cannot efficiently control and manage it for now. Start-ups do know value offered to the customer, but the truthful criterion is sold product and incoming payment. They lack to look at their own product with eyes of the customer. Customer must consider product useful, must want it and must be willing to pay for it. Start-ups are young and therefore imperfect enterprises. Imperfection is their natural characteristic. They should concentrate on what they excel in, and imperfections solve as complementary because they lack time for organic growth. A start-up must prove its viability in a couple of years before investors lose their patience and start-up its enthusiasm, stamina, and drive. Start-up obtains its energy and power from the single business idea, which purpose and ability to turn into practice will be demonstrated, must be shown in relatively short time and hence in start-up, everything is fastened.

Research performed identified impact of several factors on start-up performance. A Smaller portion of factors was relevant. Impact of a higher volume of factors was not definitely identified, and their impact on several performance indicators throughout the whole sample was not cohesive. Results of existing research might be further deepen and their causality verified, ideally with the help of experiments.

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DOES THE PHILLIPS CURVE EXIST IN INDONESIA? A PANEL GRANGER CAUSALITY MODEL

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Abstract. The short-term economic problems such as inflation and unemployment are among the most important macroeconomic problems at all times. Empirical study was conducted with a purpose to analyze the causality of the inflation rate and the open unemployment rate of 33 provinces in Indonesia from 2013 to 2017. Indonesia's geographic condition which consists of thousands of islands is a note that macro policies at the time of implementation require a long process, even need to be adjusted to pay attention to aspects of regional variation. Therefore, the Panel Data Model and Panel Granger Causality becomes an alternative to capture the possibility of variations between regions in the short term. The study showed that there was a one-way causality relationship from the inflation rate to the open unemployment rate. The trade-off between the inflation rate and the open unemployment rate was a short-term economic phenomenon, so the Sticky Price condition still applied. We found that in provinces of Indonesia the inflation rate was conditioned mainly by Demand-Pull Inflation. Thus, an effective inflation management could reduce the open unemployment. Thus, the role of government in managing the economy cannot be underestimated, both through fiscal and monetary policies. This role is emphasized more on the government's efforts to stimulate the Demand Side Economics.

Keywords: Inflation Rate; Open Unemployment Rate; Panel Data; Panel Granger Causality; Indonesia

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JEL Classifications: E600, E610

1. Introduction

Inflation is a symptom that shows a continuous increase in the general price level (Mishkin, 2011; Sasongko & Huruta, 2018, 2019). This is a problem faced by almost all countries in the world. In Indonesia, inflation problems got into the focus in the transition period (1965 to 1969), especially when Indonesia experienced hyperinflation in 1966. At that time, the inflation reached 1136.25% (World Bank, 2017). The situation began to improve when the rate of inflation in Indonesia began to decline to reach 15.52% in 1969. During the monetary crisis in 1998, the inflation rate in Indonesia increased to 58.39%. However, after the monetary crisis, Indonesia began to be able to control the inflation rate. Even in the last five years (2013 to 2017), Indonesia has been able to maintain its inflation rate during the global financial crisis in early 2009 and the debt crisis in the European Union and the United States in 2011. Figure 1 below is an overview of inflation rate for each province in Indonesia from 2013 to 2017.

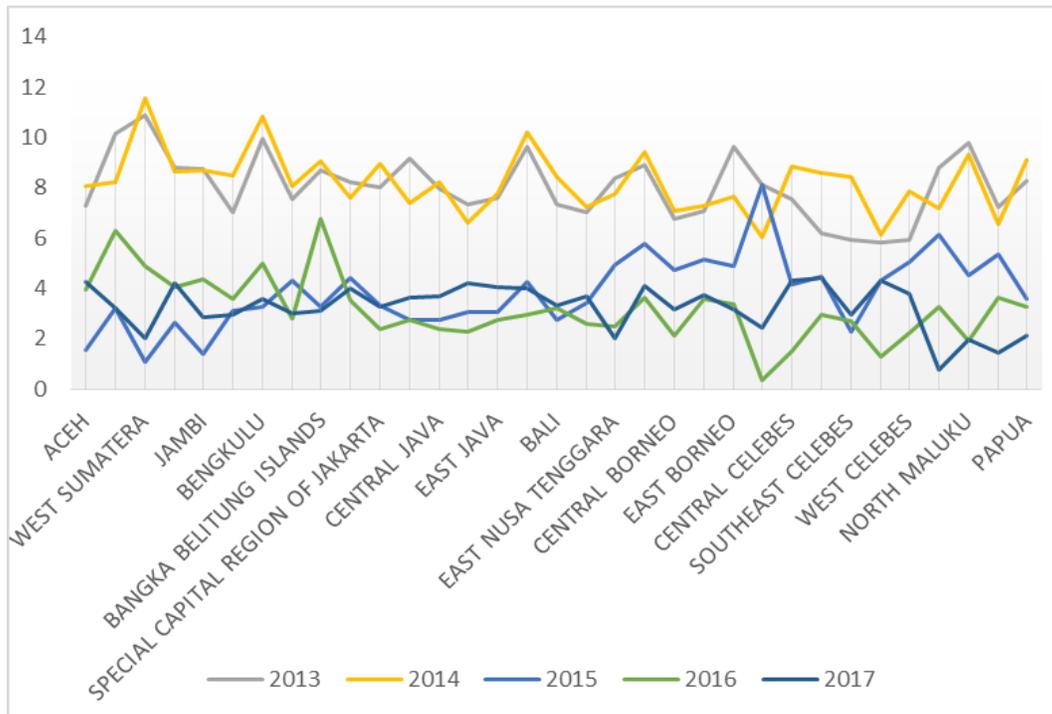


Figure 1. The Inflation Rate by Province (2013 to 2017)

Source: Bank Indonesia (2018)

Figure 1 indicates that the level of inflation in provinces in Indonesia from 2013 to 2017 can be controlled. During the global financial crisis in early 2009 and the debt crisis in the European Union and the United States in 2011, the impact was not so great for Indonesia. Although in 2013 and 2014 the inflation rate in all provinces in Indonesia experienced an increase, this was not the impact of the global crisis, instead it was caused by an increase in the fuel price which caused an increase in production costs or Cost-Push Inflation (Astuti, 2016; Badan Pusat Statistik, 2015).

Another problem that often gets into focus in the economy of every country including Indonesia is unemployment. Keynes (1936) mentioned that a country that has an unemployment rate of 4% or less can be called a country that has reached full employment, yet the unemployment rate in Indonesia is far above 4%. The following is an overview of the Unemployment Rate in each province in Indonesia from 2013 to 2017.

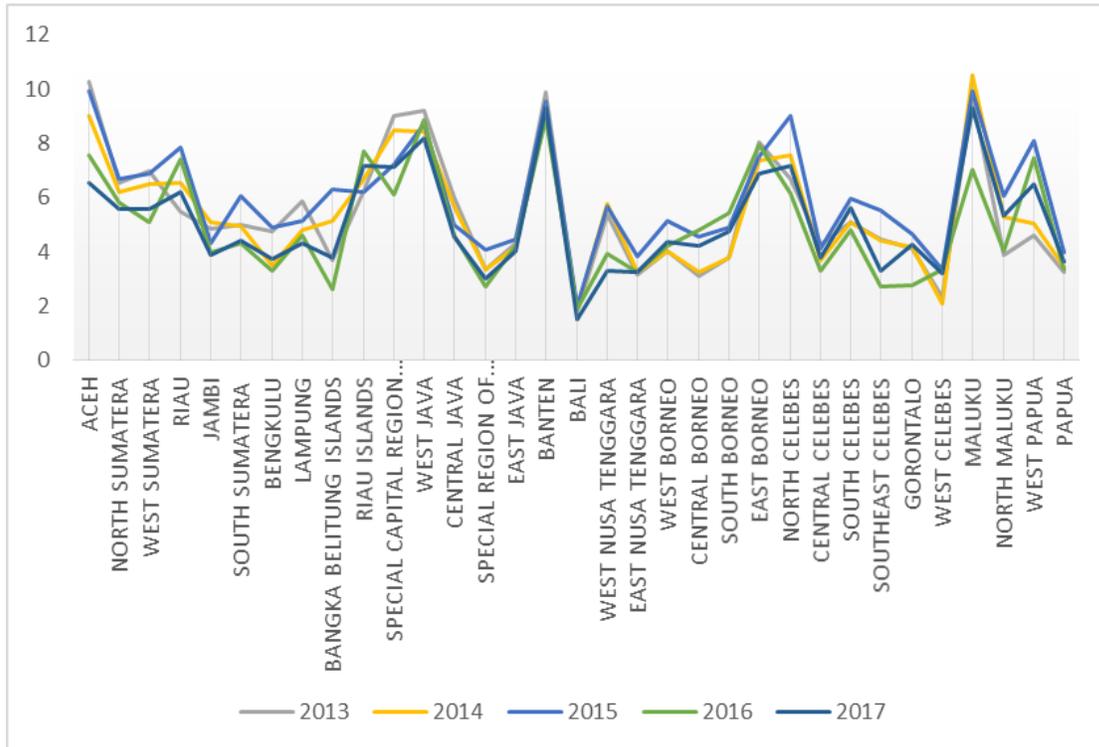


Figure 2. The Open Unemployment Rate by Province (2013 to 2017)
 Source: Badan Pusat Statistik (2017)

Figure 2 shows that the open unemployment rate in each province fluctuates. The highest open unemployment rate in 2017 occurred in Maluku province at 9.29% and the lowest occurred in Bali province at 1.48%. This is certainly different from the inflation situation in 2013 and 2014, which has increased, but the open unemployment rate tends to be constant.

Inflation and unemployment are two economic phenomena, which will always occur in the economy of any country (Keynes, 1936; Phillips, 1958; Bhanthumnavin, 2002; Družić, Tica, & Mamić, 2006; Pallis, 2006; Furuoka, 2007; Furuoka, 2008; Furuoka & Munir, 2009; Katria et al., 2011; Kogid, Asid, Mulok, Lily, & Loganathan, 2011; Caporale & Škare, 2011; Zaman, Khan, Ahmad, & Ikram, 2011; Umaru & Zubairu, 2012; Sergo, Saftic, & Tezak, 2012; Touny, 2013; Mahmood, Bokhari, & Aslam, 2013; Thayaparan, 2014; Al-zeaud, 2014; Cioran, 2014; Arshad, 2014; Benati, 2015; Alisa, 2015; Israel, 2015; Sa'idu & Muhammad, 2015; Štefan & Bratu, 2016; Astuti, 2016; Bhattarai, 2016; Okafor, Chijindu, & Ugochukwu, 2016; Blanchard, 2016; Recher, Matošec, & Pali, 2017; Tung, 2019). With five years of data (2013 to 2017), this study aims to analyze short-term trade-offs between the inflation rate and the open unemployment rate of 33 provinces in Indonesia. Indonesia's geographic condition which consists of thousands of islands is a note that macro policies at the time of implementation require a long process, even need to be adjusted to pay attention to aspects of regional variation. Therefore, the research model with the Panel Data Model and Panel Granger Causality becomes an alternative to capture the possibility of variations between regions in the short term.

2. Literature Review

In the United Kingdom, Phillips (1958) found that there was a negative relationship between the level of unemployment and the level of wage inflation. In the United States, Blanchard (2016) found that there was a

negative relationship between the rate of inflation and the unemployment rate. Furthermore, Keynes (1936) argued that the unemployment rate could be stabilized by stimulating aggregate demand through fiscal or monetary policy. Friedman (1968) also proved that the Phillips curve only applied in the short term. This happened because during the period there would be a phenomenon that prices were not easily changed (Sticky Price). Still with the same findings, Caporale & Škare (2011) found a one-way causality between inflation and employment opportunities in countries that are members of the Organization for Economic Co-operation and Development. This encourages policymakers to pay attention to employment growth and output growth in the short and long term. In Malaysia, Furuoka (2007) found a one-way causality between inflation and unemployment. These findings indicate a cointegration relationship and a causal relationship between the rate of inflation and the unemployment rate in Malaysia. Still in the same country, Kogid et al. (2011) found a one-way causality between inflation and unemployment. This finding supported the trade-off relationship between inflation and unemployment in Malaysia. In the United States, Ştefan & Bratu (2016) found a one-way causality between inflation and unemployment. This finding encourages policymakers to carry out programs aimed at reducing the unemployment rate such as creating projects for productive workers and controlling the inflation rate. In Pakistan, Mahmood et al., (2013) found a one-way causality between inflation and unemployment. This finding encourages experts to maintain an equilibrium point between inflation, unemployment and the interest rate. Still in the same country, Zaman et al., (2011) found a long-term relationship and one-way causality between the rate of inflation and unemployment. This study provides a strong empirical evidence about the existence of the Phillips curve in Pakistan, both in the long and short term. In Nigeria, Sa'idu & Muhammad (2015) found a one-way causality between inflation and unemployment. This finding encourages the joint efforts of policymakers to restructure the economy, manage price volatility and improve infrastructure. In Russia, Alisa (2015) found that in the long run there was no existence of the Phillips curve between inflation and unemployment, but in the short term, it showed the existence of the Phillips curve. In Thailand, Bhanthumnavin (2002) found that the Phillips curve applied in Thailand for the short term, precisely when the Asian economic crisis occurred in 1997. Further, Katria et al., (2011) found a negative relationship between inflation and unemployment rates in countries belonging to the South Asian Association for Regional Cooperation. This indicates that collaboration between monetary and fiscal policies can be used to stabilize the business cycle. Meanwhile, Bhattarai (2016) found a long-term and negative relationship between inflation and unemployment in countries that are members of the Organization for Economic Co-operation and Development. In Nigeria, Okafor et al. (2016) found that inflation had a negative effect on unemployment. This finding encourages policymakers not only to rely on monetary targets but also on output targets through economic deepening to maintain optimal inflation rates and minimal unemployment. In the European Union and Romania, Cioran (2014) found inflation had a negative effect on unemployment. This empirical finding indicates that the inflation rate is an effective instrument in preventing an increase in unemployment in the European Union and Romania.

In Egypt, Touny (2013) found that in the long run, unemployment had a positive impact on inflation. This finding encourages policymakers to be able to implement monetary policy to overcome inflationary pressures without fear of their negative impact on the unemployment rate. Further, Israel (2015) found that in the long run there was a positive relationship between inflation and unemployment in France, Germany, the United Kingdom, and the United States.

In Pakistan, Arshad (2014) found a two-way causality between the level of unemployment and inflation. This indicates that inflation has contributed to variations in unemployment compared to economic growth and the unemployment rate has more contribution to variations in inflation compared to economic growth. In Sri Lanka, Thayaparan (2014) found a two-way causality between inflation and unemployment. This condition indicates both unemployment and inflation have a significant role for macroeconomics in Sri Lanka.

In Croatia, Recher, Matošec, & Pali (2017) did not find the existence of the Phillips curve in Croatia. It is therefore important to urge caution from decisive interpretations and conclusions from the empirical research of

the Phillips curve and to sustain from suggestions to policymakers due to the sensitivity of the results and ambiguous empirical findings. Sergio, Saftic, & Tezak (2012) found that the causes of unemployment in Croatia occurred due to structural reasons, and not due to the low inflation rate. Still in the same country, Družić, Tica, & Mamić (2006) found that there is not any significant relationship between inflation and unemployment. During the recessions, companies in Croatia does not lay off people. Due to insolvency-based adjustment, factually unemployed are not fired but subsidized (through insolvency) by future generations, which are going to pay back debts accumulated during the recession. Next, Furuoka & Munir (2009) used Pooled Ordinary Least Square modeling and one-way or two-way fixed effects and found that there was a heterogeneity among the five ASEAN countries (Malaysia, Singapore, Indonesia, Thailand, and the Philippines). This indicates a difference in economic conditions among the five countries, which cause that there is no significant relationship between inflation and unemployment. Further, Furuoka (2008) who studied in the Philippines found no causality between inflation and unemployment. It is suspected that socio-economic factors such as output gaps are better able to explain the Phillips curve in the context of the Philippine economy. In Nigeria, Umaru & Zubairu (2012) found no causality between inflation and unemployment. This indicates that the Phillips curve does not apply in Nigeria. Therefore, it is necessary to use the unemployment and inflation theory based on the data and situation of Nigeria. In Jordan, Al-zeaud (2014) found no causal relationship between inflation and unemployment. This condition occurred because foreign workers were not included in the calculation of the unemployment rate, so that it could inhibit the trade-off between the two variables in the short term. In Indonesia, Astuti (2016) and the Central Bureau of Statistics (2015) proved that there was no relationship between inflation and unemployment. This occurred because inflation in Indonesia was not caused by an increase in the number of aggregate demand (Demand-Pull Inflation), but was caused by the rising production costs such as fuel oil prices, electricity rates and other production costs (Cost-Push Inflation).

Overall, previous studies still show varied results such as one-way causality, two-way causality and no causality between the inflation rate and the unemployment rate. In addition, previous studies also used varied econometric modeling. Thus, it can be indicated that there is an uncertain relationship between the rate of inflation and the open unemployment rate in various countries.

3. Research Methods

The data used in this study was the inflation rate and the open unemployment rate originating from Bank Indonesia and the Central Bureau of Statistics. Both of these data were panel data consisting of 33 provinces in Indonesia and the observation period from 2013 to 2017. The initial steps were taken in testing the Panel Data and Panel Granger Causality were conducting panel data stationary testing (Granger, 1969).

$$Y_{it} = \rho_i Y_{it-1} + X_{it} \delta_i + \epsilon_{it} \quad (1)$$

There are three types of models that can be used in panel data regression, namely Common Effect Model, Fixed Effect Model and Random Effect Model (Winarno, 2015):

$$Y_{it} = \alpha_0 + \beta X_{it} + e_{it} \quad (2)$$

$$Y_{it} = \alpha_{0i} + \beta_1 X_{it} + \beta_2 d_{1i} + \dots + \beta_{33} d_{32i} + e_{it} \quad (3)$$

$$Y_{it} = \alpha_{0i} + \beta X_{it} + e_t \quad (4)$$

The selection of the best model in the panel data was based on the Chow test or Hausman test (Winarno, 2015). Another thing to note was the need to fulfill various assumptions so that the model could be used as a good predictor. The equation that met the classic assumption was only the equation that used the Generalized Least Square (GLS) method. In the panel data, the estimation model that used the GLS method was only Random Effect Model, while the Fixed Effect Model and Common Effect Model used Ordinary Least Square (OLS). In the panel

data that used the Fixed Effect Model only heteroscedasticity tests were conducted (Gujarati & Porter, 2012). The heteroscedasticity test in this study used the Glejser method, which was to regress all the independent variables to the absolute value of the residual $|e|$. If there was a significant independent variable effect on the residual absolute value, then in the model there was a heteroscedasticity problem (Winarno, 2015).

$$|u|_i = \alpha + \beta X_i + v_i \quad (5)$$

In the Panel Granger Causality testing, it was necessary to determine the optimal lag (Winarno, 2015). After determining the optimal lag, the Panel Granger Causality test was performed (Granger, 1969).

$$Y_{it} = \alpha_{0i} + \alpha_{1i}Y_{it-1} + \dots + \alpha_{ki}Y_{it-k} + \beta_{1i}X_{it-1} + \dots + \beta_{ki}X_{it-k} + \epsilon_{it} \quad (6)$$

$$X_{it} = \alpha_{0i} + \alpha_{1i}X_{it-1} + \dots + \alpha_{ki}X_{it-k} + \beta_{1i}Y_{it-1} + \dots + \beta_{ki}Y_{it-k} + \epsilon_{it} \quad (7)$$

Further, in the Panel Granger Causality, the Stacked Causality Test was (Granger, 1969).

$$\alpha_{0i} = \alpha_{0j}, \alpha_{1i} = \alpha_{1j}, \dots, \alpha_{li} = \alpha_{lj}, \forall_{i,j} \quad (8)$$

$$\beta_{1i} = \beta_{1j}, \dots, \beta_{li} = \beta_{lj}, \forall_{i,j} \quad (9)$$

Panel data was treated as a large data set that was stacked without taking a value behind one cross-section to the next cross-section. This method assumed that all coefficients were the same in all cross-sections.

4. Results

4.1 The Panel Data Stationary Test Results

The stationary test results of panel data is presented in Table 1.

Table 1. The Panel Data Stationary Test Results

Variables	Integration Degree	Prob.		Conclusion
		Levin Test	PP Test	
DInflation Rate	first difference	0.0065	0.0000	I(1)
Open Unemployment Rate	level	0.0000	0.0104	I(0)

*DInflation Rate shows the inflation rate at the first order of integration degree or I(1)

Source: the authors

Table 1 indicates that the open unemployment rate has been stationary at the integration level or I(0). This is proven by a probability value that is smaller than the critical value ($\alpha=5\%$). While the inflation rate is not stationary at the integration level degree, so the first differentiating principle (first order) must be done. The results of first order differentiation or I(1) indicate that the inflation rate has been stationary. This is proven by a probability value which is smaller than the critical value ($\alpha=5\%$).

4.2 The Chow Test and Hausman Test Results

The selection of the best models based on the Chow Test and the Hausman Test. The test results for both models are presented in Table 2.

Table 2. The Chow Test and Hausman Test Results

Test	Prob.	Best Estimation Model
Chow	0.0000	Fixed Effect Model
Hausman	0.0377	Fixed Effect Model

Source: the authors

Table 2 indicates that the results of the Chow test show a probability value that is smaller than the critical value ($\alpha=5\%$). This shows that the most appropriate model to explain the phenomenon of the short-term relationship between the inflation rate and the open unemployment rate is the fixed effect model. Further, the results of the Hausman test show that the probability value is smaller than the critical value ($\alpha=5\%$). Thus, the best model used in panel data regression is the fixed effect model.

4.3 The Heteroscedasticity Test Results

After selecting the best model, the next step was to do a classic assumption test. The results of the classical assumption test with heteroscedasticity test are in Table 3.

Table 3. The Heteroscedasticity Test Results

Dependent Variable: RESABS	
Variable	Prob.
Dinflation	0.3464

Source: the authors

Table 3 proves that the residuals contain homoscedasticity. This means that each variant of the residual between observations is the same. This is indicated by the probability value of the RESABS and DInflation regression results which are greater than the critical value ($\alpha=5\%$).

4.4 The Fixed Effect Model Test Results

After determining the best model and heteroscedasticity test, the results of the fixed effect model test are presented in Table 4.

Table 4. The Fixed Effect Model Test Results

Variable	Coefficient	t-statistic	Prob.
C	5.261522	70.22658	0.0000
DInflation	-0.086793	-3.343438	0.0012
R-Squared	0.884986		
Prob (F-statistic)	0.000000		

Source: the authors

Table 4 indicates that the inflation rate has a negative and significant effect on the open unemployment rate. This is evidenced by the probability value of the DInflation which is lower than the critical value ($\alpha=5\%$).

4.5 The Cross Section Effect Results

After testing the Fixed Effect Model, it was necessary to pay attention to the constant differences between objects (although it used the same regression coefficient) (Winarno, 2015). This is presented in Table 5.

Table 5. The Cross Section Effect

Province	Effect	Province	Effect
Aceh	2.943405	West Nusa Tenggara	-0.659643
North Sumatera	0.680781	East Nusa Tenggara	-1.996925
West Sumatera	0.562813	West Borneo	-0.920475
Riau	1.649548	Central Borneo	-1.133158
Jambi	-1.066205	South Borneo	-0.599180
South Sumatera	-0.416909	East Borneo	2.031397
Bengkulu	-1.544212	North Celebes	2.097130
Lampung	-0.640533	Central Celebes	-1.612875
Bangka Belitung	-0.930951	South Celebes	0.058903
Riau Islands	1.581598	Southeast Celebes	-1.325302
Special Capital Region of Jakarta	1.876969	Gorontalo	-1.326313
West Java	3.187462	West Celebes	-2.314592
Central Java	-0.385489	Maluku	3.758562
Special Region of Yogyakarta	-2.043277	North Maluku	-0.260942
East Java	-1.119872	West Papua	1.375723
Banten	3.821185	Papua	-1.795819
Bali	-3.532804		

Source: the authors

Table 5 indicates that approximately 60% of 33 provinces in Indonesia have negative constant values. This means that when inflation was zero, unemployment would decrease by its constant value. These provinces included Jambi, South Sumatera, Bengkulu, Lampung, Bangka Belitung, Riau Islands, Special Capital Region of Jakarta, West Java, Central Java, Special Region of Yogyakarta, East Java, Bali, West Nusa Tenggara, East Nusa Tenggara, West Kalimantan, Kalimantan Tengah, South Kalimantan, East Kalimantan, Central Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, North Maluku and Papua. While the remaining 40% of the 33 provinces in Indonesia have a positive constant value. This means that when inflation was zero, unemployment would continue to increase by the constant value.

4.6 The Lag Length Test Results

The results of the Lag Length Test are in Table 6.

Table 6. The Lag Length Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-128.1420	NA	9.131016	7.887394	7.978091	7.917911
1	-88.62019	71.85784	1.061634	5.734557	6.006649	5.826108
2	-75.02529	23.07013	0.595709	5.135048	5.606535	5.305633
3	-66.21600	13.88132*	0.448836*	4.861576*	5.496458*	5.075194*

*Indicates the optimal lag

Source: the authors

Table 6 indicates that the optimal lag to describe the influence of a variable on its past variables and other endogenous variables is lag 3. This means that lag 3 was used to determine the causality between the inflation rate and the open unemployment rate. This was proven by the Akaike Information Criterion (AIC) value of 4.861576 which is smaller than the AIC value in other lags.

4.7 The Panel Granger Causality Test Results

The Panel Granger Causality test results using Stacked Test Causality can be seen in Table 7.

Table 7. The Panel Granger Causality Test Results

Null Hypothesis	F-stat	Prob.
DInflation Rate does not Granger Cause Open Unemployment Rate	3.35522	0.0341
Open Unemployment Rate does not Granger Cause DInflation Rate	1.46758	0.2464

Source: the authors

Table 8 indicates that the hypothesis stating that there is no Granger Causality between the DInflation rate and the open unemployment rate is rejected. The rejection of the null hypothesis is based on the probability value of 0.0341 which is smaller than the critical value ($\alpha=5\%$). While the hypothesis stating that there is no Granger Causality between open unemployment and DInflation rates is accepted. The acceptance of the null hypothesis is based on a probability value of 0.2464 which is greater than the critical value ($\alpha=5\%$). Thus, the DInflation rate caused the open unemployment rate, but not vice versa.

5. Discussion

The results of the Panel Data and Panel Granger Causality analysis in this study are supported by the findings of Phillips (1958), Blanchard (2016), Keynes (1936), Friedman (1968), Caporale & Škare (2011) Furuoka (2007), Kogid et al. (2011), Ștefan & Bratu (2016), Mahmood et al. (2013), Zaman et al. (2011), Sa'idu & Muhammad (2015), Alisa (2015), Bhanthumnavin (2002), Katria et al. (2011), Bhattarai (2016), Okafor et al. (2016), and Cioran (2014) which stated that there was a negative relationship between the inflation rate and the unemployment rate.

There were several factors influencing the relationship between the inflation rate and the open unemployment rate in the short term. First, the Phillips curve phenomenon of the trade-off between the rate of inflation and the unemployment rate was a short-term economic phenomenon, so Sticky Price applied, whereas in the long run flexible prices applied. In other words, the unemployment rate would return to its natural level and then the relationship between inflation and unemployment becomes positive (Friedman, 1968; Keynes, 1936). This view emerged as a criticism of the weaknesses of the idealistic (utopian) classical theory of market assumptions and over-supply of Supply Side Economics. In reality, the market structure tended to be monopolistic, information was imperfect and asymmetrical, and inputs and outputs were exchanged heterogeneously. Thus, the market was unable to balance. As a result, there were economic disturbances that tended to bring about a recession. Therefore, the active means of government were needed in managing the economy, both through fiscal and monetary policies. Government needs to put efforts to stimulate the Demand Side Economics. Second, the inflation rate in provinces in Indonesia was caused more by the demand-side pull or Demand-Pull Inflation (Phillips, 1958; Sa'idu & Muhammad, 2015; Keynes, 1936; Bhattarai, 2016; Katria et al., 2011; Alisa, 2015). Unlike the findings of Astuti (2016) and Badan Pusat Statistik (2015), they mentioned that inflation in Indonesia was caused by cost-push inflation. A finding by Sukirno (2014) explained that inflation that occurred due to demand-pull would cause a decrease in the unemployment rate. An increase in demand would result in an increase in prices. In this condition, the producer increased its production capacity. In the context of an economy that focused on Intensive Labor, efforts to increase production capacity would encourage additional workforce. This is presented in Figure 3 providing information about the addition of labor in the three main sectors, namely Industry, Trade, Restaurants and Accommodation Services as well as Financial Institutions, Real Estate, Rental and Corporate Services.

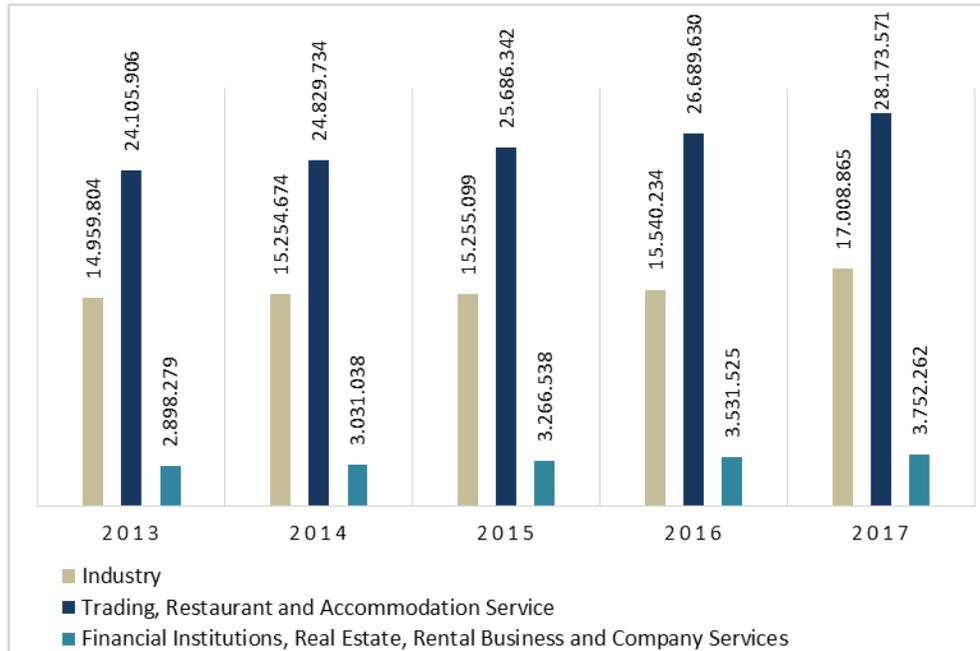


Figure 3. The Population of 15 Years and Older Who Work Based on The Main Employment Field (2013 to 2017)

Source: Badan Pusat Statistik (2018b)

Figure 3 indicates that the high inflation rate from 2013 to 2014 has an impact on increasing employment opportunities on the three main sectors above. This condition continues from 2016 to 2017 which shows an increase in employment such as in the Industry, Trade, Restaurants and Accommodation Services, Financial Institutions, Real Estate, Rental and Corporate Services sectors which experience a 2% increase in percentage; 3.9%; 8.1% in 2015 to 2016 and 9.4%; 5.5%; 6.2% in 2016 to 2017. Thus, these three sectors were considered as a sector that relied heavily on labor in an effort to increase its production.

In addition, from the demand side, it is also indicated by the increase in household consumption (Keynes, 1936; Friedman, 1968; Mahmood et al., 2013; Sa'idu & Muhammad, 2015). Facts prove that household consumption in Indonesia from 2013 to 2014 was higher than the previous period. This can be seen in Figure 4.

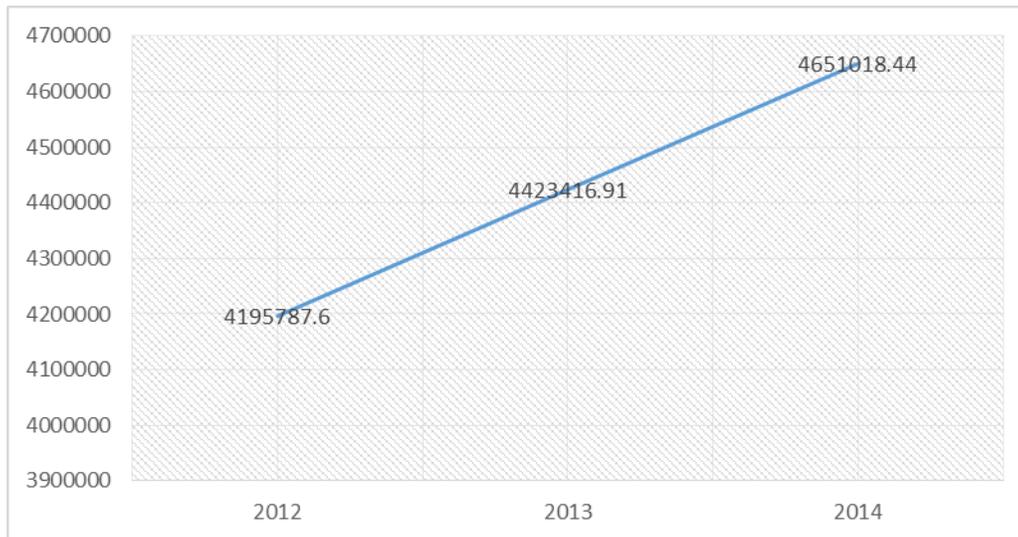


Figure 4. The Gross Domestic Product on The 2010 Constant Price Based on The Expenditures (Billions of Rupiah) (2012 to 2014)
 Source: Badan Pusat Statistik (2018)

Figure 4 indicates that household consumption in 2013 increases from 5.4% in the previous year. The same also happens with the consumption in 2014 with a percentage increase of 5.14%. This indicates that during this period there was an effect of increasing demand which resulted in Demand-Pull Inflation (Phillips, 1958; Sa'idu & Muhammad, 2015; Keynes, 1936; Bhattarai, 2016; Katria et al., 2011; Alisa, 2015).

Indonesia consists of 33 provinces that have diverse cultural and economic backgrounds. The inflation rate from 2013 to 2017 had a downward trend. On the other hand, the open unemployment rate in the same period was relatively constant, although there was a tendency for a decline. This can be seen in Figure 5.

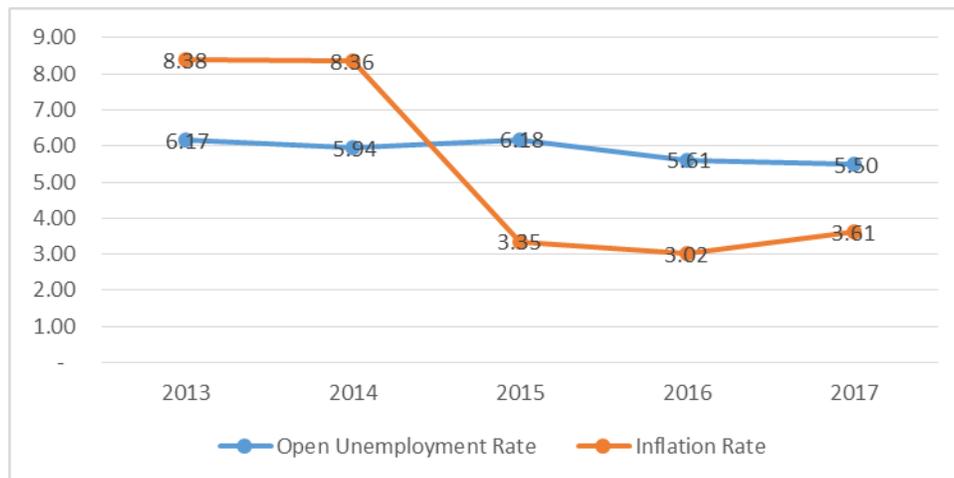


Figure 5. The Inflation Rate and Open Unemployment Rate (2013 to 2017)
 Source: Badan Pusat Statistik (2017b); Bank Indonesia (2018)

Figure 5 indicates that in 2013 and 2014, the inflation rate in Indonesia is quite high, reaching 8.38% and 8.36%. This condition was caused by the increase in the fuel oil price (Astuti, 2016; Badan Pusat Statistik, 2015). However, for the period of 2015 to 2017, there was an inflation rate which was below the Bank Indonesia inflation target of $\pm 4\%$. The decline in the inflation rate was supported by the development of price transparency

in every region of Indonesia, which was getting better. On the other hand, the open unemployment rate does not experience significant changes. However, it has a fluctuating trend in 2013 (6.17%) which decreases in 2014 (5.94%). Furthermore, it increases to 6.18% in 2015 and then continues to decline in 2016 to 2017 (5.61% and 5.50%).

Furthermore, there were five provinces with the highest average inflation rate and two provinces with the lowest average inflation rate. This can be observed in Figure 6.

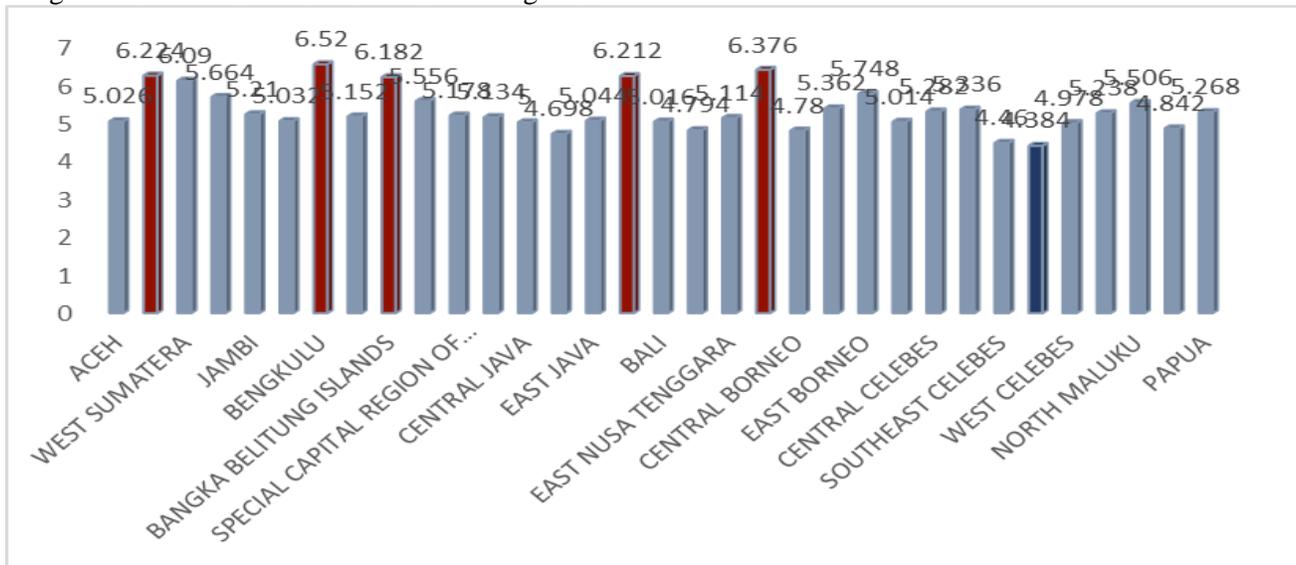


Figure 6. The Average of Inflation Rate by Province (2013 to 2017)
Source: Bank Indonesia (2018)

Figure 6 indicates that there are five provinces with the highest average of inflation rate in 2013 to 2017, which includes Bengkulu, West Kalimantan, North Sumatera, Banten and Bangka Belitung Islands with an average inflation rate of more than 6%. The lowest average inflation rate in 2013 to 2017 is Gorontalo and Bali with an average of less than 4,384%. The analysis was based on a comparison with the inflation target of Bank Indonesia in 2013 to 2014 as high as $\pm 4.5\%$ and in 2015 to 2017 of $\pm 4\%$.

In addition to the average inflation rate, the average of open unemployment rates by province from the highest and the lowest open unemployment rate can be seen (Figure 7).

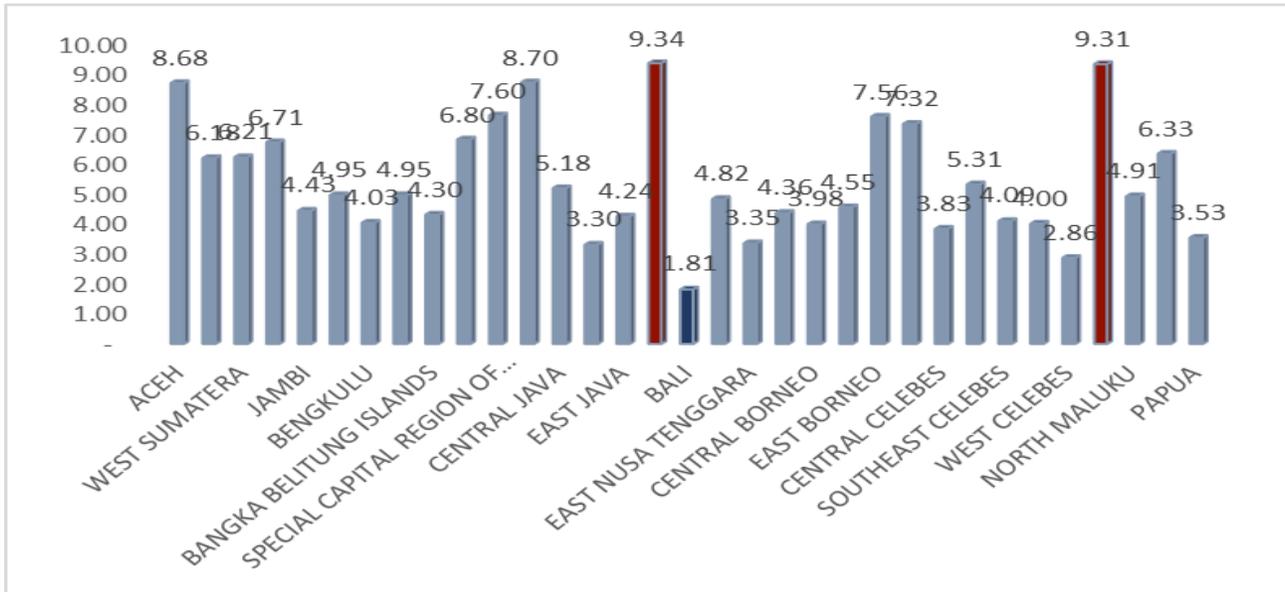


Figure 7. The Average of Open Unemployment Rate by Province (2013 to 2017)
Source: Badan Pusat Statistik (2017a)

Figure 7 indicates that provinces with high open unemployment rates include Banten and Maluku, each reaching 9.34% and 9.31%, while the lowest include Bali at 1.81%. The interesting thing was, that there were several provinces in Indonesia that showed the relationship between the rate of inflation and the open unemployment rate. This means that the inflation rate and the open unemployment rate were equally high or vice versa. This condition occurred in Banten province (one of the five provinces with the highest inflation rate and the highest open unemployment rate in Indonesia). While the opposite condition was shown by the provinces of Bali and Gorontalo which had an average inflation rate that reached the target and the average low open unemployment rate. Furthermore, there were also those who had inversely related relationships. This means that there were provinces that had high inflation rates, while the open unemployment rate was low and vice versa. This condition was demonstrated by the provinces of Bengkulu and West Kalimantan, which had an average inflation rate that was above the target of Bank Indonesia compared to the average of open unemployment rate, which was fairly low. Furthermore, the provinces of Maluku, Aceh and West Java showed the average inflation rate that reached Bank Indonesia's target compared to the high average open unemployment rate.

Conclusion

This study showed that there was a one-way relationship from the inflation rate to the open unemployment rate. This finding was proven through an analysis of Data Panel and Granger Causality Panel. This finding ultimately proved that the Phillips curve is still alive and well of 33 provinces in Indonesia. There were several factors supporting this finding such as (1) the sticky price was still in the short term, whereas in the long run flexible prices applied. In the long run, the unemployment rate would return to its natural level. As a result, the relationship between inflation and unemployment became positive. (2) the inflation in provinces in Indonesia was caused more by demand-pulling (Demand-Pull Inflation), not due to the cost-push inflation.

Inflation is an effective policy instrument to overcome the problem of unemployment in Indonesia. This argument implies that inflation management is effective to reduce the unemployment rate. Therefore, the role of government is needed in managing the economy, both through fiscal and monetary policies. This role is emphasized more on the government's efforts to stimulate the demand side (Demand Side Economics).

Indonesia's geographical condition which consists of thousands of islands might lead to the adoption of macro policies to take longer time. This happens because of the greater need to adjust differences between regions. Thus, the use of the Data Panel and Panel Granger Causality models is more appropriately used to explain the trade-off between the inflation rate and the open unemployment rate in the short term.

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TRUST AND DEVELOPMENT IN EDUCATION AND SCIENCE*

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Abstract. Education and science play an increasingly significant role in the development of modern society as well as the economy. The number of years people spend on education has been steadily increasing over the past century, and this phenomenon has become truly global. Thence, one would probably agree that education strengthens its importance in social and economic life, and its development becomes an important indicator of the economic well-being and sustainable development of any given country. Our paper scrutinizes the indicators of development and trust in education and science using a case study from Russian Federation, a country where education has a very important, yet a dubious and debatable significance. In Russian society, a paradoxical situation has developed in many ways with attitudes in society towards the state of the education system, which is reflected in the gap in the desire to give their children (or grandchildren for that matter) the highest level of education coupled with a very low rate of assessment of this very education. We measure and apply the indicators of growth of science and education based on the level of trust which is taken as a proxy of the quality of social capital. We show that a high level of trust characterizes social capital, which contributes to the establishment of depersonalized (impersonal) social ties, both outside and inside organizations. On the other hand, the low level of trust causes a dysfunction of management and complicates the formation of social ties and is characterized by the dominance of institutions that limit the possibilities of social and professional mobility. Our results and outcomes can be useful for constructing economic and social measures for supporting the growth of science and education as well as for finding the most effective pathways for achieving the sustainable development of this field which leads to the increase in the economic competitiveness of a country.

Keywords: education, science; development; sustainability; social capital; indicators; economic growth

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1. Introduction

The role of education and science in today's world can hardly be underestimated. The development in this field is becoming a crucial objective for any country aiming at achieving sustainable economic growth. Consequently, education strengthens its importance in social and economic life, and its development becomes an important indicator of the economic well-being of a country.

Many recent research studies and reports noted that education should be considered more widely than just a mixed good (Biesta, 2015). Instead, it should be perceived not only as a private good (i.e. accumulation of human capital of an individual) but also as a public good that forms common values and competencies that, in turn, increase the effectiveness of the community as a whole (Natkhov, 2011; Kalyugina et al., 2015; Vasylichak and Halachenko, 2016; or Gulicheva and Osipova, 2017; Tkacova et al., 2018). This becomes an important aspect in the West (including the European Union Member States and their well-designed educational and employment policies) as well as in the East (Čábelkova et al., 2015; Höschle et al., 2015; Jiroudková et al., 2015; Volchik et al., 2018; Senan, 2018).

Along with the growing importance of education in modern society there is a certain dissatisfaction with its quality. This trend can also be observed in Russia and represents a truly worrying pattern (see Volchik and Maslyukova, 2017). What can explain the decline in subjective assessments of the state of the education system in a society? Since subjective assessments of the state of the education system are largely related to a variety of personal expectations, on the one hand, underestimating the benefits of education, on the one hand, and overestimating educational expenses, on the other, leads to a decrease in educational aspirations, as well as an increase in mistrust to the education system in society, and, as a result, lower subjective assessments (Wong et al., 2015; Lisin et al., 2015; Sommerfeld, 2016; Lisin et al., 2016). One may easily agree with the argument that an increase in the duration and coverage of higher and vocational education is sometimes considered as a factor of instability in the labor market. The massification of higher education leads to the fact that graduates can not find a job that meets their expectations for qualifications and pay (see Volchik and Posukhova, 2016).

This paper takes the level of trust as the main indicator of the quality of social capital. A high level of trust characterizes social capital, which contributes to the establishment of depersonalized (impersonal) social ties, both outside and inside organizations (Strielkowski et al., 2016). The low level of trust causes a dysfunction of management and brings many complications to the formation of social ties and is characterized by the dominance of institutions that limit the possibilities of social and professional mobility. Some recent studies showed that in the context of political and economic crises, the role of citizens' confidence in institutions increases dramatically, and social and political trust in the stability of public institutions becomes more important to their economic efficiency (Putnam, 2000; Ostrom and Ahn, 2007). Moreover, we contemplate with the idea that not only interpersonal trust depends on the quality of social capital, but also trust in social institutions which, in particular, is reflected in the subjective assessments of the shape and the level of development of the education system in a given country.

Social capital bound can be viewed in the context of different types of trust: general (to all, in general), social or personified (represented by the environment, neighbors, or colleagues) and institutional (represented by the various types of social institutions) (see Mironova, 2014; or Niño-Amézquita et al., 2017). Here, one can see that social or personified trust is a more specific matter than other types of trust. Thence, speaking of social trust, people assess their attitude not towards abstract images but towards specific people.

The Russian specifics of both personified and institutional trust are characterized by low indicators measuring this trust. In fact, among the state institutions, relatively high levels of trust over the past fifteen years have been observed only when it came to such institutions as the president and the army. These outcomes may be one of the

consequences of a widespread relationship that can be described in the framework of the crony capitalism model (also denoted as “crony capitalism” or “political capitalism”) (see Holcombe, 2018).

2. Education and science trends worldwide

Education is becoming a global phenomenon and a very important aspect of socio-economic sustainable development. The average time spent on education by adults in developed countries is steadily growing with every region in the world affected by this positive and favourable trend. One can see that the number of years people spend in training has steadily increased over the past 100 years, and this phenomenon has become global. If in 1870 the average duration of study was 1.2 years, by the middle of the 20th century it increased to 3.2 years, and by 2010 it is more than 7 years (see Figure 1 that follows).

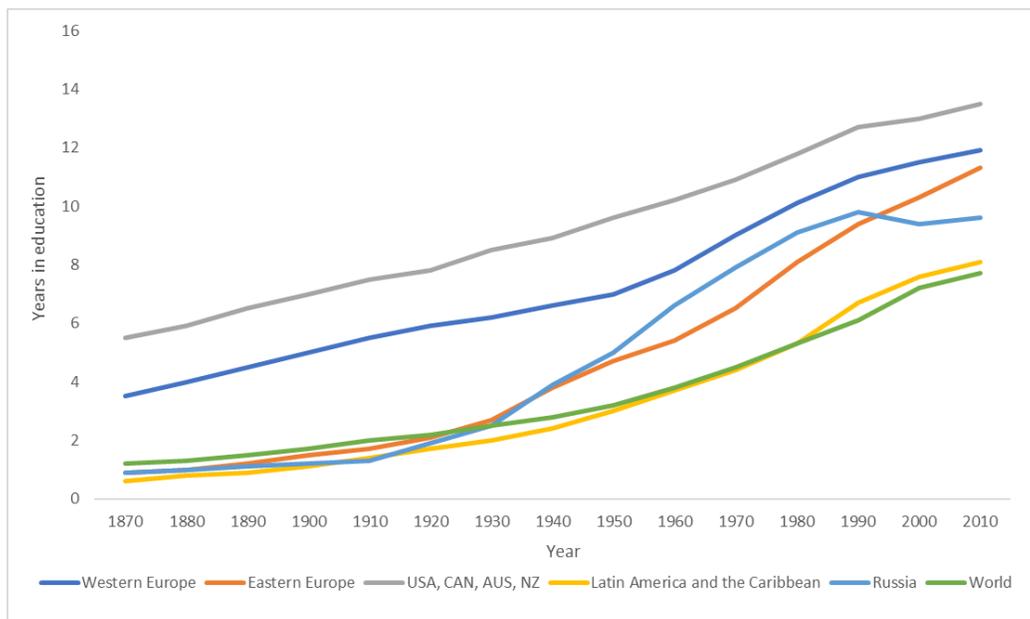


Fig.1. The average duration of training (years in education) in individual countries, 1870-2010

Source: Van Zanden (2014)

In Russian Federation, an attitude to measuring the quality and the usefulness of the education system often inclines to a paradoxical situation which is reflected in the gap in the desire to give their children (or grandchildren) the highest level of education with a very low assessment of the quality of the educational system. On the one hand, the majority of the respondents in Russia would answer the question “What kind of education would you like to give to your children or grandchildren?” by choosing the highest level of education as the most desired one. On the other hand, the assessment of the state of the education system according to the data of two waves of the European Social Research shows that this level is below 50%: in 2012, the share of respondents assessing the state of the education system not higher than 5 points was 71.75%, in 2016 this even dropped to 65.77% (European Social Survey, 2012).

Within the presented context, it becomes apparent that education is a trusting good which determines the existence of specific institutions that allow actors to make decisions about the choice of an educational institution or the trajectory of education. And here it is the quality of social capital that plays the decisive role. In relation to the education system, we are based on the following logic: a low level of trust is a fundamental characteristic of

Russian social capital which manifests itself in relation to the education system as a social institution. If the low level of trust in society did not affect the attitude to the education system in society, then we would see more positive assessments of the state of the education system than negative ones. That is, a low level of trust in other people is associated with low indicators of institutional trust, which, consequently, means a low level of satisfaction with the state of the education system, as the most important social institution. This can lead to distortions on the labor market and effect the wellbeing as a whole (see e.g. Stojanov et al., 2011; Abrhám et al., 2015; or Strielkowski and Weyskrabova 2014).

Since dissatisfaction with the quality of the education system prevails in society, it can be assumed that the general trend of distrust through social capital is also manifested in low assessments of the state of the education system and is responsible for the formation of institutional traps and dysfunctions in education and science.

Within the public discourse, as well as the discourses of managers and officials, there is dissatisfaction with the quality of education, which is often the key reason for its reform. Enders (2013) notes that *“large-scale institutional reforms in the provision of social services in general and in higher education in particular are often legitimized by statements of loss of confidence in government institutions and their effectiveness”*. The distrust into the education system is reflected in assessments of the state of the education system in society which may serve as a reason to justify the need to optimize the education sector.

The effective functioning of the education system is also associated with a level of trust depending on the institutional environment. For example, Vidovich and Currie (2011) emphasize the importance of trust in higher education policies, taking as an example the analysis of changing governance policies in Australian higher education. Moreover, it can be noted that trust is a necessary determinant for the prosperity of science in democratic societies while the subjective assessments of the educational sphere are associated with social discourse and dominant ideas that become widely accepted as institutions (Markey-Towler, 2019).

3. The model and the data

In this paper, we set up a research objective aiming at confirming or disproving the hypothesis that the level of satisfaction with the state of the education system is related to the quality of social capital (trust) and are differentiated according to signs of income, position in the labor market and level of education. The information base of the research is data from the 6th and 8th waves of the European Social Research (European Social Survey) for Russia conducted in 2012 and 2016. The sample size was 1444 people (6th wave conducted in 2012) and 1405 people (8th wave carried out in 2016).

The evaluation of the state of the education system (stfedu) serves as a dependent variable. The level of assessment of the state of the education system is measured using the question: “How do you assess the current state of the education system in our country?” The possibility of answers ranged from 0 - very poor to 10 - very good. The following characteristics are used as independent variables:

- level of education (variables edu_low - below average (basic group), edu_sr - secondary, edu_prof - professional, edu_high - higher (tertiary));
- obtaining additional education in the last 12 months (variable dop_edu, answer to the question: “Have you attended any courses, lectures, trainings or classes in the last 12 months to improve your knowledge or skills necessary for work?” with answer options: 1 - yes, 0 - no);
- experience of the unemployed (variable u_emp, answer to the question: “Have you ever had to be without work and look for a job for more than three months?” with answer options: 1 - yes, 0 - no);

- income (variable income_1 (base group), income_2, income_3, income_4, income_5, income_5, income_7, income_8, income_9, income_10, indicating that respondents belong to one of ten groups by total income of all family members per month after deducting all taxes);
- presence of work at the present time (the work variable, which takes values 1 - works, 0 - does not work);
- level of trust (social capital - variable trust). This variable is ordinal, i.e. the higher the value of the variable, the more the respondent agreed with the above statement (the level of trust is measured by the question: "Do you think that most people can be trusted, or do you tend to think that even excessive caution in dealing with people will not hurt?" With answers from 0 to 10, where "0" means "even excessive caution does not hurt "(basic group), and " 10 "-" most people can be trusted ").

As control variables, we consider the individual characteristics of workers: gender (gender variable: 1 - male, 0 - female); age (age variable), square of age (age2), marital status (married variable, taking the value 1 if the respondent currently lives with her spouse / partner, 0 - otherwise), type of settlement / place of residence (variables (domicil_1 - big city (base group), domicil_2 - suburb or outskirts of a big city, domicil_3 - a small town or urban settlement, domicil_4 - village / village, domicil_5 - farm or house in a rural area / farm) variables variables edu_f_low / edu_m_low - below average o (basic group), edu_f_sr / edu_m_sr - secondary, edu_f_prof / edu_m_prof - professional, edu_f_high / edu_m_high - higher (tertiary)).

In order to analyze the influence of selected characteristics of individuals on the subjective assessment of the state of the education system in society, it is proposed to build the following model of multiple regression (1) from spatial data for two time periods (based on 2012 and 2016 data):

$$y_i = x'_i \beta + \varepsilon_i \quad (1)$$

where y_i is the dependent variable, x is the vector of factors (independent and control variables), β is the model parameters, ε is the vector of unobservable random errors.

For testing the robustness of the results, the following ordered logit/probit model models are also constructed using spatial data for two time periods (based on 2012 and 2016 data) (2):

$$P_i (y_i=k | x) = F (c_i - x'\beta) - (c_{(i-1)} - x'\beta) \quad (2)$$

where y_i is the dependent variable, $i = (1,11)^{-}$, $k = 0,1,2, \dots, 10$, x is the vector of factors (independent and control variables), β is the model parameters, $c_i = (-\infty, +\infty)^{-}$ - constants, and F is the logistic function (for ordered logit regression) or standardized normal distribution (for ordered probit regression).

4. Results and discussions

In general, our results depicted in Figure 2 that follows demonstrate that the majority of respondents have a rather low assessment of the current state of the education system: the proportion of respondents who assessed the state of the education system as very poor (0 points) was 9.41% in 2012 and 7.47% in 2016, with the corresponding share of 10 points (very good) - only 1.80% and 1.92%.

The assessment of the state of the education system varies depending on the level of education received. Among respondents with higher education, only 6.89% highly rate the current state of the education system (grades 8-10), while 22.96% of respondents rate the current state of the education system at a low level (0-2). The largest

number of respondents (19.69%) who rate the current state of the education system as good (grades 8-10) have lower secondary education.

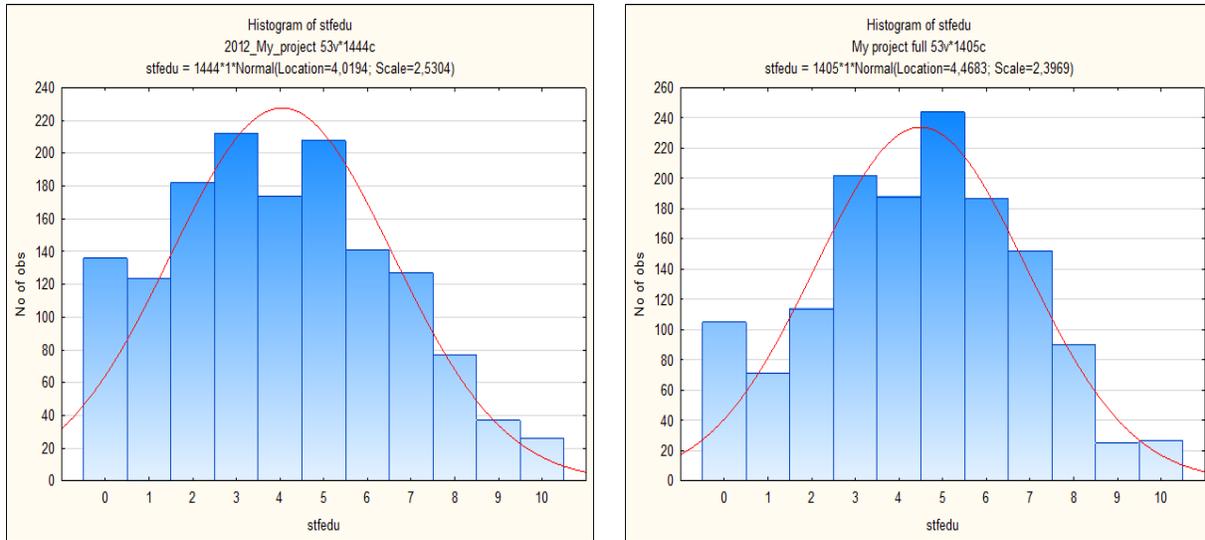


Fig.2. Histograms of subjective evaluation of education quality in Russia (2012 and 2016)

Source: Own results

Among respondents with experience of unemployed, the proportion of low marks (0-2 points) is higher than among respondents who do not have such experience (24.94% against 18.92%). In addition, our results showed that there is a parabolic dependence of the educational system estimates depending on age: the share of maximum assessments of the state of the education system reaches its minimum at the age of 46-59 years for the first period and 30-45 years for the second period of our data in question. Estimates of the state of the education system are slightly different among men and women, suggesting that they are gender-neutral. Moreover, a large number of respondents dissatisfied with the current state of the education system lived in the suburbs and villages (rural areas).

Our results show the following patterns: in both the first and second periods from which the data originates, only higher (tertiary) education adversely affects the assessment of the state of the education system in the country, which is apparently a consequence of the increase in labor market supply from highly educated workers. Obtaining additional education during the last 12 months significantly reduces the assessment of the state of the education system only in the first period, in the second period this effect disappears. Contrary to initial assumptions, the experience of the unemployed, current employment and increased income do not have a significant impact on the assessment of the state of the education system.

In the multiple regression model for two time periods, assessments of the state of the education system are positively associated with an increase in confidence (social capital). This conclusion is also confirmed in ordinal logit and probit regressions for two time periods, however, if in the first period only estimates for trust_2 and trust_3 variables, indicating an increase in confidence to level 2 and 3, respectively, are statistically insignificant compared to the base category 0 - “Even excessive caution does not hurt”, then in the second period only the variables trust_6, trust_7 and trust_8 turned out to be highly significant (see appendixes 1 and 2). Therefore, lack of trust is an important factor determining the wide dissemination in society of ideas about the need for fundamental reform and optimization of the sphere of education and science. In addition, as expected beforehand,

the obtained assessments of the state of the education system were gender-neutral. For two periods, the parabolic dependence of the estimates of the state of the education system on age was confirmed.

Having a spouse / partner does not affect the state of the education system. The residence effect also has no significant effect on the state of the education system: for the first period, the statistically significant predictor with a positive sign was *domicil_4* (village / village living) and *domicil_5* (living on a farm or in a separate house in a rural area / farm) with the basic category - *domicil_1* (living in a big city), for the second period only the predictor *domicil_5* is significant.

Finally, in both the first and second periods, the presence of a father's secondary education (*edu_f_sr*) increases the subjective assessment of the current state of the education system. The same effect is observed in the first period in relation to the predictor *edu_m_sr* - the presence of secondary education in the mother.

The stability of the results obtained from the data corresponding to different time periods indicates their robustness. Thus, the conducted econometric analysis confirmed the connection between the subjective assessments of the current state of the education system and the quality of social capital (trust). In addition, in all specifications, there is a negative impact of the presence of higher (tertiary) education on the assessment of the state of the education system in the country: more educated people are more critical about the state of the education system in the country. The analyzed relationship between indicators of income levels and the situation on the labor market (job availability, experience of the unemployed) and assessments of the state of the education system has not been confirmed, which apparently requires further research.

Conclusions

Overall, our results revealed a low subjective assessment of the state of the education system. One of the most important results of our study is that the level of trust is mainly positively related to the state of the education system. A special role in assessing the state of the education system in the country is assigned to the level of education received. The growth of labor supply on the part of highly educated workers and the overestimated expectations of a future career determine the human perception of his social environment, which directly affects the low subjective assessments of the state of the education system in people who have completed higher (tertiary) education.

Generally, the lack of trust into institutions may be the best indicator of public discontent with the modern world. Low public assessment of the quality of the education system serves as a basis for substantiating reforms in this area, therefore, in the discourse of reform developers, the improvement of the quality of education is associated with optimization. Optimization of education takes place against the backdrop of the dominance of the ideas of management and new management in the public sector (New Public Management, or NPM). NPM optimization is aimed at creating a competitive environment, introducing market mechanisms and rationalizing costs.

The broad spectrum of public attitudes, opinions as well as ideas about the need to optimize the sphere of education and science is institutionalized in regulatory measures and policies aimed at optimizing (reducing the number of teachers, the number of universities, scientific institutions). In the future, the quantitative assessments will serve to develop a program of qualitative research of narratives, conducting questionnaires and in-depth interviews to identify institutionalized rules that structure recurring interactions in the field of education and science, as well as answering the question of whether institutional reforms in higher education and science cause a lack of confidence and how likely it is that they will help restore confidence and raise levels of appreciation within the society and general public.

Appendix 1 - Factors (marginal effects) that affect the subjective assessment of the state of the education system (2012)[†]

	ols	margins ologit 0	margins oprobit 0	margins ologit 10	margins oprobit 10
edu_sr	-0,296 (0,313)	0,016 (0,018)	0,018 (0,020)	-0,003 (0,004)	-0,004 (0,004)
edu_prof	-0,362 (0,313)	0,019 (0,018)	0,024 (0,020)	-0,004 (0,004)	-0,005 (0,004)
edu_high	-0,702** (0,323)	0,039** (0,018)	0,045** (0,020)	-0,008* (0,004)	-0,010** (0,005)
dop_edu	-0,593*** (0,186)	0,034*** (0,011)	0,037*** (0,012)	-0,007*** (0,002)	-0,008*** (0,003)
u_emp	-0,051 (0,153)	0,002 (0,008)	0,004 (0,010)	-0,000 (0,002)	-0,001 (0,002)
income_2	0,744 (0,474)	-0,036 (0,027)	-0,041 (0,029)	0,007 (0,005)	0,009 (0,007)
income_3	1,101** (0,448)	-0,052** (0,025)	-0,066** (0,028)	0,010* (0,005)	0,015** (0,007)
income_4	0,756* (0,456)	-0,032 (0,025)	-0,043 (0,028)	0,006 (0,005)	0,010 (0,007)
income_5	0,468 (0,441)	-0,019 (0,025)	-0,028 (0,027)	0,004 (0,005)	0,006 (0,006)
income_6	0,651 (0,443)	-0,029 (0,025)	-0,035 (0,027)	0,006 (0,005)	0,008 (0,006)
income_7	0,539 (0,454)	-0,024 (0,025)	-0,032 (0,028)	0,005 (0,005)	0,007 (0,006)
income_8	0,826* (0,448)	-0,042* (0,025)	-0,048* (0,028)	0,008 (0,005)	0,011* (0,006)
income_9	0,635 (0,454)	-0,031 (0,025)	-0,038 (0,028)	0,006 (0,005)	0,008 (0,006)
income_10	0,427 (0,444)	-0,023 (0,025)	-0,025 (0,027)	0,005 (0,005)	0,005 (0,006)
work	-0,254 (0,177)	0,011 (0,010)	0,015 (0,011)	-0,002 (0,002)	-0,003 (0,003)
trust	0,169*** (0,026)				
gender	-0,099 (0,146)	0,006 (0,008)	0,008 (0,009)	-0,001 (0,002)	-0,002 (0,002)
age	-0,078*** (0,026)	0,004*** (0,001)	0,005*** (0,002)	-0,001** (0,000)	-0,001*** (0,000)
age2	0,001*** (0,000)	-0,000*** (0,000)	-0,000*** (0,000)	0,000** (0,000)	0,000** (0,000)
married	0,076 (0,152)	-0,002 (0,008)	-0,004 (0,010)	0,000 (0,002)	0,001 (0,002)
domicil_2	0,114 (0,299)	-0,014 (0,017)	-0,012 (0,019)	0,003 (0,003)	0,003 (0,004)
domicil_3	0,197 (0,162)	-0,014 (0,009)	-0,014 (0,010)	0,003 (0,002)	0,003 (0,002)
domicil_4	0,429** (0,192)	-0,029*** (0,011)	-0,027** (0,012)	0,006** (0,002)	0,006** (0,003)
domicil_5	1,991*** (0,446)	-0,094*** (0,028)	-0,105*** (0,030)	0,018*** (0,006)	0,023*** (0,008)
edu_f_sr	0,509** (0,234)	-0,034** (0,013)	-0,032** (0,015)	0,007** (0,003)	0,007** (0,003)
edu_f_prof	0,242 (0,245)	-0,018 (0,014)	-0,016 (0,016)	0,004 (0,003)	0,004 (0,004)
edu_f_high	0,214 (0,281)	-0,017 (0,016)	-0,010 (0,018)	0,003 (0,003)	0,002 (0,004)
edu_m_sr	-0,498** (0,239)	0,028** (0,014)	0,030* (0,015)	-0,006* (0,003)	-0,007* (0,004)
edu_m_prof	-0,207 (0,252)	0,011 (0,014)	0,013 (0,016)	-0,002 (0,003)	-0,003 (0,004)
edu_m_high	0,007 (0,269)	-0,002 (0,015)	-0,002 (0,017)	0,000 (0,003)	0,000 (0,004)
trust_1		-0,055** (0,024)	-0,060** (0,025)	0,011** (0,005)	0,013** (0,006)
trust_2		-0,009	-0,011	0,002	0,002

[†] Note: Robust standard errors are shown in parentheses; *** p<0.01, ** p<0.05, * p<0.1

		(0,020)	(0,022)	(0,004)	(0,005)
trust_3		-0,022	-0,029	0,004	0,006
		(0,020)	(0,021)	(0,004)	(0,005)
trust_4		-0,048**	-0,061***	0,009**	0,014***
		(0,020)	(0,022)	(0,004)	(0,005)
trust_5		-0,041**	-0,050**	0,008**	0,011**
		(0,019)	(0,021)	(0,004)	(0,005)
trust_6		-0,068***	-0,082***	0,013***	0,018***
		(0,021)	(0,023)	(0,004)	(0,006)
trust_7		-0,088***	-0,103***	0,017***	0,023***
		(0,022)	(0,023)	(0,005)	(0,006)
trust_8		-0,071***	-0,084***	0,014***	0,019***
		(0,022)	(0,023)	(0,005)	(0,006)
trust_9		-0,093***	-0,109***	0,018***	0,024***
		(0,029)	(0,031)	(0,006)	(0,008)
trust_10		-0,109***	-0,117***	0,021***	0,026***
		(0,035)	(0,035)	(0,008)	(0,009)
_cons	4,962***				
	(0,725)				
Number of observations	1 444	1 444	1 444	1 444	1 444

Appendix 2 - Factors (marginal effects) that affect the subjective assessment of the state of the education system (2016)[‡]

	ols	margins_ologit_0	margins_oprobit_0	margins_ologit_10	margins_oprobit_10
edu_sr	-0,255 (0,296)	0,014 (0,013)	0,013 (0,015)	-0,004 (0,004)	-0,004 (0,005)
edu_prof	-0,504* (0,290)	0,025* (0,013)	0,027* (0,014)	-0,006* (0,004)	-0,009* (0,005)
edu_high	-0,901*** (0,300)	0,042*** (0,014)	0,048*** (0,015)	-0,011*** (0,004)	-0,015*** (0,005)
dop_edu	-0,255 (0,188)	0,011 (0,009)	0,013 (0,011)	-0,003 (0,002)	-0,004 (0,003)
u_emp	-0,274* (0,146)	0,011 (0,007)	0,014* (0,008)	-0,003 (0,002)	-0,005* (0,003)
income_2	-0,085 (0,285)	0,001 (0,013)	0,003 (0,015)	-0,000 (0,003)	-0,001 (0,005)
income_3	-0,280 (0,310)	0,015 (0,014)	0,017 (0,017)	-0,004 (0,004)	-0,005 (0,005)
income_4	-0,194 (0,335)	0,012 (0,015)	0,013 (0,017)	-0,003 (0,004)	-0,004 (0,005)
income_5	-0,041 (0,293)	0,003 (0,014)	0,005 (0,016)	-0,001 (0,004)	-0,002 (0,005)
income_6	-0,209 (0,296)	0,010 (0,014)	0,013 (0,016)	-0,003 (0,004)	-0,004 (0,005)
income_7	0,279 (0,294)	-0,013 (0,014)	-0,015 (0,016)	0,003 (0,004)	0,005 (0,005)
income_8	0,220 (0,305)	-0,011 (0,014)	-0,009 (0,017)	0,003 (0,004)	0,003 (0,005)
income_9	0,155 (0,353)	-0,009 (0,017)	-0,008 (0,020)	0,002 (0,005)	0,002 (0,006)
income_10	-0,019 (0,399)	0,006 (0,018)	0,002 (0,021)	-0,002 (0,005)	-0,001 (0,007)
work	-0,029 (0,175)	0,002 (0,008)	0,002 (0,009)	-0,000 (0,002)	-0,001 (0,003)
trust	0,113*** (0,028)				
gender	-0,130 (0,142)	0,006 (0,007)	0,007 (0,008)	-0,001 (0,002)	-0,002 (0,003)
age	-0,086*** (0,026)	0,004*** (0,001)	0,005*** (0,001)	-0,001*** (0,000)	-0,002*** (0,001)
age2	0,001*** (0,000)	-0,000*** (0,000)	-0,000*** (0,000)	0,000*** (0,000)	0,000*** (0,000)
married	0,000 (0,147)	0,001 (0,007)	-0,001 (0,008)	-0,000 (0,002)	0,000 (0,003)

[‡] Note: Robust standard errors are shown in parentheses; *** p<0.01, ** p<0.05, * p<0.1

domicil_2	-0,536 (0,337)	0,020 (0,018)	0,030 (0,022)	-0,005 (0,005)	-0,009 (0,007)
domicil_3	0,107 (0,149)	-0,008 (0,007)	-0,008 (0,008)	0,002 (0,002)	0,002 (0,003)
domicil_4	0,047 (0,181)	-0,003 (0,009)	-0,004 (0,010)	0,001 (0,002)	0,001 (0,003)
domicil_5	1,679*** (0,446)	-0,081*** (0,030)	-0,089*** (0,035)	0,021** (0,008)	0,028** (0,012)
edu_f_sr	0,486** (0,225)	-0,021** (0,011)	-0,027** (0,012)	0,005* (0,003)	0,008** (0,004)
edu_f_prof	0,445* (0,255)	-0,021* (0,012)	-0,024* (0,014)	0,006* (0,003)	0,008* (0,004)
edu_f_high	0,400 (0,275)	-0,018 (0,013)	-0,021 (0,016)	0,005 (0,004)	0,007 (0,005)
edu_m_sr	0,058 (0,229)	-0,004 (0,011)	-0,005 (0,012)	0,001 (0,003)	0,002 (0,004)
edu_m_prof	0,252 (0,247)	-0,015 (0,012)	-0,017 (0,014)	0,004 (0,003)	0,005 (0,004)
edu_m_high	0,160 (0,286)	-0,009 (0,014)	-0,012 (0,016)	0,002 (0,004)	0,004 (0,005)
trust_1		0,012 (0,017)	0,018 (0,019)	-0,003 (0,005)	-0,006 (0,006)
trust_2		-0,020 (0,015)	-0,015 (0,016)	0,005 (0,004)	0,005 (0,005)
trust_3		-0,017 (0,014)	-0,014 (0,015)	0,004 (0,004)	0,005 (0,005)
trust_4		-0,020 (0,014)	-0,018 (0,016)	0,005 (0,004)	0,006 (0,005)
trust_5		-0,024* (0,013)	-0,021 (0,014)	0,006* (0,003)	0,007 (0,005)
trust_6		-0,052*** (0,015)	-0,050*** (0,016)	0,014*** (0,004)	0,016*** (0,006)
trust_7		-0,037** (0,015)	-0,032* (0,016)	0,010** (0,004)	0,010* (0,005)
trust_8		-0,061*** (0,017)	-0,066*** (0,018)	0,016*** (0,005)	0,021*** (0,007)
trust_9		-0,026 (0,025)	-0,017 (0,027)	0,007 (0,007)	0,005 (0,009)
trust_10		-0,044* (0,023)	-0,044* (0,026)	0,012* (0,006)	0,014 (0,009)
_cons	6,095*** (0,620)				
Number of observations	1 405	1 405	1 405	1 405	1 405

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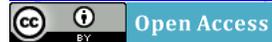
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BIOMASS BLOCKCHAIN AS A FACTOR OF ENERGETICAL SUSTAINABILITY DEVELOPMENT*

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Abstract. As the conjuncture of the energetic system in countries or different regions changes, renewable energy sources play a significant role. Thanks to them, it is possible to move from pollute fossil fuels to sustainable use of clean resources. It is widely acknowledged that the use of biomass waste promotes better environmental state and sustainable development because the waste that cannot be recycled is used for energy production. This article describes the usage of blockchain technology-based biomass systems that not only allows tracing the emergence of biomass, but also contributes to the development of sustainable energy. The research shows that a biomass blockchain enables simplification of biomass production process, thus saving resources and contributing to the expansion of forests and the development of common energy system.

Keywords: blockchain; biomass clusters; sustainability; biomass trading systems

JEL Classifications: O13, P34, Q56

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1. Introduction

During the past few years sustainable energetics development has manifested itself not only in the quantity of emerged new power plants but also in the scale of increased business efficiency. Seeking to diversify the supply risks and simultaneously increase the level of sustainability, attempts are made to extend the variety of used biomass resources as much as possible. The use of different biomass resources balances the effect on the

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environment as waste that is formed at the particular time can be utilized. According to Borowski (2008), the most effective way to secure the nation's energy supply is with a diverse renewable energy portfolio of clean, efficient, and domestically-produced energy sources. Energy security has become a priority as the World's population increases and their standard of living improves thus increasing energy consumption. The finite nature of fossil fuel reserves and the political instability of many of the countries which supply fossil fuels have caused concern over future energy security and costs. The likely result of fossil fuel deficit is that, as the cost of these commodities increases, they will only be affordable for large industrial processes and therefore cheaper renewable sources must be found for domestic purposes (Srovnalíková, Karbach, 2016). Seeking to stock biomass supplies it is necessary to concentrate information on the subjects of biomass supply and consumption simultaneously increasing the efficiency of their activities. It is commonly known that unified subjects that supply, process and realize biomass resources could become more competitive compared to the business units that use fossil fuels. Ballarin, Vecchiato, Tempesta, Marangon (2011) adds that energy production from biomasses can be an important resource that, when combined with other green energies such as wind power and solar plants, can contribute to reduce dependency on fossil fuels. That allows creating sustainable energy system that is based on waste utilization thus avoiding the negative environmental effects. Using biomass forms a synergic effect that multiply the positive effects of biomass use. When energy is produced from local renewable resources a positive effect is applied not only to the environment and sustainable development but also to other processes. According to Roberts (2007) bioenergy can be a solution for matters relating to economic, national, environmental and political security. All these factors are interrelated because the economic and social structure of the country can assist in strengthening national security. When local resources are used situations where hostile countries manipulate the resources and energy prices can be avoided. Other researchers have a similar view to the usage of biomass. Although the biomass energy sector can be seen as static and lacking novel management practices preconditions that could be transferred to this sector are forming within the market. New activity measures could help managing the constantly increasing data flows and make the activities of the subjects operating in the biomass energy business more efficient.

The efficiency of biomass usage can be increased using contemporary information technology tools. Blockchain is one of these tools, a system that concentrates relevant information. The blockchain technology can be identified as the transformed concept of clusters. Transactions are confirmed using encrypted information in an impenetrable system that is based on common activity. In the case of biomass usage, it could help ensure the quality of biomass and stock traceability. Transactions are confirmed by both, interested parties and all other actors within the system. Since the transactions are approved in virtual environment it saves time, material resources and fastens the work planning process. Generally speaking, indirectly it contributes to the expansion of sustainable development because a result that satisfies all parties is reached faster and with less resources. The literature analysis in this article is focuses on to two key aspects – the genesis of biomass energetics and principals of blockchain technology. The two can be combined to a unified system with the purpose of increasing the level of sustainable development within the area. This research will focus on the development of biomass energetics using the contemporary measures for transactions. A lot of previous studies researched the biomass energetics and blockchain technology as two separate occurrences looking in different directions. The purpose of this article is to research the possibility to adapt blockchain technology to traditional sustainable energy production using biomass. The purpose of the article will be fulfilled if the following goals are achieved: (1) analysis of the possibilities to use blockchain technology in biomass energetics business is conducted; (2) prerequisites for biomass clusters' conversion to blockchains are established; (3) ways how using blockchain technology could ensure the development of sustainable energetics are determined.

2. Prerequisites for biomass clusters' conversion to blockchains

The efficiency of biomass energy is based on the cooperation of supply chain actors. The supply chain consists of subjects producing biomass, converters, transportation business representatives, energy distribution systems and energy power plants. Developing cooperation-based activities can help reach competitive advantage against business units that use fossil fuels. The activities of biomass clusters significantly contribute to sustainable development in the regions because local renewable resources are used that are in most cases not suitable to be recycled. Generally speaking the structure of the cluster is suitable for the development of biomass energy business and taking advantage of the latest technological solutions to the purpose of more effective energy sales expanding them and forming tighter relations with end users.

Biomass cluster is focused on fulfilling energy demands in a certain region and therefore is different from most of the business clusters that are focused towards a foreign consumer. Since the activity field of the cluster is local it involves a significant amount of human and capital resources. Campbell, Price (2008) describes the key advantage of biomass and sustainable energy: most renewable energy technologies are decentralized; and as such, reduce the impact arising from technological malfunctions or terrorist attacks which could seriously impair a nation's electricity grid. Valentine (2011) states that investments to biomass energy could help diversify the profit acquired from extraction of fossil fuels. Braun, McRae-Williams, Lowe (2005) claims that large firms internalize much of the lateral, horizontal and vertical scope of a cluster. They are able to do so because they have economies of scale. SMEs are limited in their access to specialized resources and intelligent capital (Virglerova, et al., 2016; Belas, et al., 2016). Grigoras, Scarlatache (2015) believes that the key benefits of biomass use are: energy efficiency, rational use of energy, competition policy, diversification of energy sources, availability of modular generating plants, ease of finding locations for smaller generators, shorter construction times, and lower capital costs. Korobeinikov, Read, Parshotam, Lermitt (2010) says that land allocation policy with the aim to biomass production and forestry can play a major role in controlling greenhouse gas levels. This might result in a significant economical push for the countries because of the emerging necessity to reform the existing energy related policies. Significant investments that would stimulate the economic circulation are needed for this purpose. Kiriya, Kajikawa (2014) adds that use of biomass is desirable for several reasons that include energy security factors, environmental concerns, foreign exchange savings, and socioeconomic issues. Rocha (2004), Mura, et al. (2017); Tvaronavičienė (2017); Razminienė, Tvaronavičienė (2018) signify the effect for the whole business system: clusters foster entrepreneurship providing established relationships and better information about opportunities; lowering entry and exit barriers; providing access to physical, financial, and commercial infrastructure; easing the spin offs of new companies from existing ones; reducing risk and uncertainty for aspiring entrepreneurs; and providing a cultural environment where establishing one's own business is normal and failure is not a social stigma. Bergman, Feser (2011) and Adu, Shokunbi, Cole, (2014) extend the thought about the advantages of clustering to SME that later impacts the economy. When small manufacturing enterprises cluster together, they have the potential to gain from local and external economies through collective efforts. Thus, enterprises have the capacity to engage in flexible specialization where they perform certain operations or produce certain types for other enterprises. These joint actions enable small enterprises to derive competitive advantage from external economies (Srovnalíková, et al., 2018). Collective efficiency is facilitated by clustering on a number of factors including product specialization, rapid production of specialized products, emergence of suppliers, emergence of service producers, marketing agents, pooling of skilled labor and formation of consortia or association for specific services and lobbying. Gajšek, Kovač (2016) complements this idea indicating the benefits of cluster activity to its members: achieving synergies in the area of knowledge enhancement, joint purchasing and marketing, strategy and objectives, trust among members, as many as possible joint development projects with both long and short-term effects, financial independence from government incentives.

The information provided allows understanding under what conditions biomass energy sectors develop in different countries. Biomass is used to produce thermal energy, electricity and natural gas as well. Under these circumstances the activity of biomass cluster can be digitalized and adjusted to consumer needs. Energy produced through biomass cluster activities are most commonly realized through energy distribution subjects. Blockchain

technology opens a possibility to communicate directly with retail clients and this way confirm electricity transactions. Smart contracts allow to exchange resources in the fastest way having the reliability insurance. A person who seeks to acquire electricity can approach the producer and pay him for the purchased amount using blockchain technology.

Furthermore, blockchain technology can help creating a smart grid that would ensure a more effective energy distribution. Blockchain would help creating a decentralized energetic system this way increasing the level of sustainability in the energy sector. At the same time, it would improve the utilization possibilities of electricity produced from biomass during the summer when the general energy demand is decreased. The essence of the smart grid is the possibility to address the supply and demand changes within the energy system in real time that ensures a more effective utilization of resources. Biomass energy stands out because it can balance the energy system in those cases when it is loaded with vast amount of sun and wind energy.

Finally, blockchain may make existing electric industry processes more efficient by serving as the backbone for utilities' "smart grid" management systems that automatically diagnose network emergencies and problems and reconfigure in reaction to them (Basden, Cottrell, 2017). That significantly reduces the level of resource waste speeding the pace of sustainable development. This makes it possible to supply the energy produced from biomass to consumers faster meanwhile the consumers would be able to create value through the use of green energy. This would extend the positive biomass effect on the environment because the smaller amounts of wasted fuels would attest for the proper utilization of renewable resources.

There are other ways that blockchain technology can be used to promote the consumption of renewable energy. Energy consumption could be connected to the assets of the powerplant that administrates the energy distribution and virtual currency. In this case it is suggested to create a cryptocurrency that would be connected to the amount of energy produced. This measure should encourage the consumption of renewable energy. In particular, cryptocurrency is a kind of digital currency rewarding energy producers. In addition to the usual way of getting coins through mining, cryptocurrency can be granted by the cryptocurrency foundation as long as you have generated the renewable energy (Zheng, Xie, Dai, Wang, 2016). Energy could be acquired both ways – using commonly recognized currencies or the virtual currency released by the energy producer. This way a synergy between different types of activities is reached and possibility to purchase green energy is promoted. That is very important for Y generation that is affected by the green movement.

The growing influence of the green energy movement formed the need to manage the demand. To balance the demand, negotiations with consumers take place to define the how intense the consumption of energy should be during certain times of the day. Blockchain technology would simplify the calculations of energy consumption and would allow to distribute the green energy more easily. Previous researches show that blockchain based distributed demand side management can be used for matching energy demand and production at smart grid level, the demand response signal being followed with high accuracy, while the amount of energy flexibility needed for convergence is reduced (Pop, Cioara, Antal, Anghel, Salomie, Bertoncini, 2018). When synergy is reached using previously mentioned smart grid it is possible to avoid the grid overload and properly calculate the amount of green energy consumed. At the same time energy produced from biomass would be directed towards the highest demand the particular time. Consumers that are committed to use higher volumes of energy during certain moments will rely on sun and wind energy and as its amount will decrease biomass volume will grow. It is stated that a blockchain provides a distributed software architecture that enables agents (human or artificial) to interact without a central governing institution. However, despite the absence of intermediaries during runtime, blockchain-based systems always rely on the correctness of predefined rules, and thus it is crucial to ensure they are secure, reliable and accurate. Moreover, blockchain technology is still at an emergent stage and struggles with a variety of problems (e.g., limited transaction loads), and the complexity of current protocols and implementations still provides challenges for researchers, practitioners, and users (Mengelkamp, et al., 2018).

In conclusion it can be said that biomass energetics and blockchain technology has overlapping point that can help create additional value. Cluster based biomass energy system can be transformed to a blockchain if selling, accounting and payment activities would be processed in the digital environment. For this concept to come to life a common operating mechanism needs to be established. The model is created based on the positive effects of biomass consumption and the possibility for the blockchain technology to complement it extending at a wider range reaching a larger number of consumers.

3. Methodology

The study is based on scientific induction and deduction methods. Also, systematic, logical and comparative analysis of scientific literature is used. Blockchains are a relatively new phenomenon, so there are currently no objective statistics that can justify the scale of their creation. At the same time, comparable statistics cannot be obtained. The article presents theoretical assumptions on how biomass clusters could be transformed to blockchains, discusses current situation of the energy sector and methods that would strengthen the biomass cluster through the use of blockchain technology. The study reassures that the usage of the latest technology results in a positive impact on the economy and allows us to create guidelines for the dissemination of these technologies in the traditional business sectors.

4. The effect formed using biomass in energetics and its connection to the blockchain

The usage of biomass in energetics significantly changes the conjuncture of the market and contributes to the improving environmental situation. Synergy with the blockchain would significantly increase the sustainability level and would allow achieving even better environmental results. The main reason for business to do it is positive financial effect received from turning waste to energy. Traditional biomass energy system combined with blockchain technology would create possibility to increase the level of energetic security and to ensure fast energy and stock related transactions. Blockchain can improve the energy circulation when it is produced in a biomass cluster structure. Decreased waste of time and material resources increases the efficiency of the activities and general sustainability level.

According to do Carmo Farinha, de Matos Ferreira, Gouveia (2014), competitiveness creates the basic conditions for sustainable development and growth, to the creation of new production activities and new jobs, and for a better quality of life. McCauley, Stephens (2012) extends this idea claiming that sustainable energy cluster initiatives aim to stimulate local and regional economic development by creating the conditions that attract and promote innovative firms in the area of sustainable, renewables-based energy. Firms engaged in the development and implementation of renewable energy technologies, smart grid technologies, and low-impact transportation systems are particularly sought, as these sectors are seen as high growth sectors with potential to both address critical sustainability challenges and solidify and advance a region's knowledge-based economy. Varun, Prakash, Bhat (2009) distinguished sustainability assessment indicators: energy pay-back time; GHG emissions; cost of electricity generation. Lund (2007) adds that sustainable energy development strategies typically involve three major technological changes: energy savings on the demand side, efficiency improvements in the energy production, and replacement of fossil fuels by various sources of renewable energy.

Cluster activity ensures that natural waste that cannot be recycled will be used to produce the energy. Sustainable use of resources is a prerequisite for a cluster that distinguishes it in the context of other producers. Being able to produce economic and financial value from raw biological waste, cluster becomes an important economical subject that countrywide engages in politics of energetics within the regions. At the same time conditions for blockchain expansion turning waste to an object that can be realized. According to Lozano (2008), the important step in the quest for sustainability would be help to equalize the importance and integrate the three aspects, where

the ‘relative’ importance and impact of the economic aspects should be equal to that of the environmental and social ones. López-Menéndez, Pérez, Moreno (2014) claims that sustainable energy policies should be promoted in order to spur economic growth and environmental protection in a global context, particularly in terms of reducing greenhouse gas emissions that contribute to climate change.

Sustainable energy management represents an important component in local development. This is of particular importance in agricultural regions where biomass resources are just inexhaustible (Kurowska, Kryszk, Bielski, 2014). The economic results of the production and use of biomass include: sustainable growth, diversity of fuels, more jobs in the countryside, higher income tax, more investment in the durable assets stimulating the development of agriculture, gaining an international competitive advantage (Sanchez, Cardona, 2008). Management can be expressed through both, traditional structures and the use of blockchains to realize resources. To avoid wasting resources it is recommended to modify the traditional biomass cluster structure adapting the concept of blockchain by moving the information on fuel extraction and transactions to digital environment.

Saxena, Adhikari, Goyal (2009) defines key benefits of biomass use in energetics:

- The combustion of biomass produces less ash than coal combustion and the ash produced can be used as a soil additive on farms, etc.;
- The combustion of agricultural and forestry residues and municipal solid wastes (MSW) for energy production is an effective use of waste products that reduces the significant problem of waste disposal, particularly in municipal areas;
- Biomass is a domestic resource which is not subject to world price fluctuations or the supply uncertainties as of imported fuels.

The structure of biomass sector satisfies the key principles of sustainable development. Following the direction of sustainable development, we seek balance between social, economic and environmental interests. The balance can be reached if the business is built around combined different interests. Figure 1 shows that merging different interests forms reactions that later contribute to the development of sustainable business model. By combining different interests, we can reach synergy and form a new type of positive effect to the business subject and the society. The sustainable development model is inherent to the inclusion of the society to the business processes. At the same time, it is a cornerstone for the biomass energy sector.

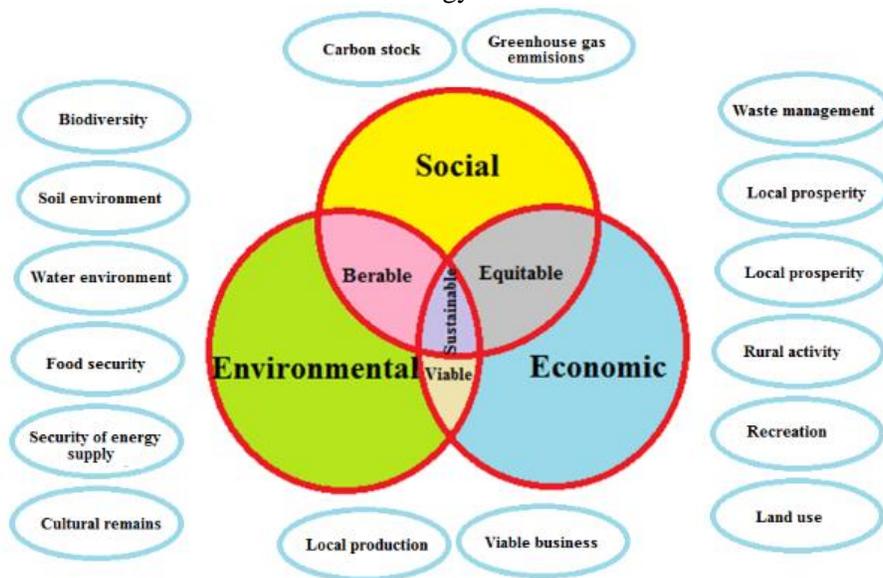


Fig.1. Sustainable development connections and interactions

Source: Ladanai, Vinterbäck, 2009; Hjulfors, Hjerpe, 2010

Moving towards the cluster activity mechanism based on blockchain technology it is important to note that a significant amount of efficiency and sustainability is ensured through the digitalizing the accounting of transactions. That would simplify the energy supply procedures, ensure the energy supply security and would allow producing the amounts that the market would realize in real time. This would save natural resources and help prevent energy overproduction. The waste of resources in case of overproduction would be prevented at the base level. The production of biomass would be regulated based on the contracts that would be approved using blockchain. Afterwards when biomass is turned to energy it would be distributed to the subject that have purchased it.

There is also an alternative view to the effects of using blockchain in energetics. It is related to optimization and simplification of existing operations. It covers both, administrative and technical processes. Mylrea, Gourisetti (2017) claims that additional potential blockchain benefits, may also: (1) enhance the trustworthiness and preserve the integrity of the data; (2) support multifactor verification through a distributed ledger; (3) secure integrity of transaction data; (4) reduce costs of energy exchanges by removing intermediaries; (5) all transactions would be executed in real time and settled on the basis on actual consumption; (6) enabling consumers to also be producers could provide additional storage and help substation balancing from bulk energy systems; (7) enable a more secure distributed escrow to maintain ordered time stamped data blocks that can't be modified retroactively; (8) rapid detection of data anomalies may enhance the ability to detect and respond to cyber-attacks; (9) help align currently dispersed blockchain initiatives and facilitates technology deployment through easy to implement and secure applications; (10) potentially help reduce transaction costs in the energy sector; (11) distribution system operators can leverage the blockchain to receive energy transaction data required to charge their network costs to consumers; (12) transmission system operators would have reduced data requirements and constraints for clearing purposes. Based on the amplitude covered by the blockchain technology we can recognize a perspective extending it to the energy sector. By utilizing existing resources more efficiently and adjusting to consumer needs, sustainable development growth can be achieved.

Biomass blockchain structure is based on the use of traditional resources but the transactions are processed exclusively in digital environment. This is covered by smart contracts that speed the transaction administration procedures. In this case a deposit equal to a certain amount of cryptocurrency is needed. It serves as an insurance policy ensuring the credibility of both business subjects. With the help of the blockchain synergic effect can be reached as based on smart contracts the energy would be transferred through the smart grid. It allows to know the precise amount of energy and time when it is transferred to the consumer also ensuring real time payment for the energy. In this case the activities related to energy production (upper part of the scheme) take the most time and the following activities are executed parallelly or at the same time.

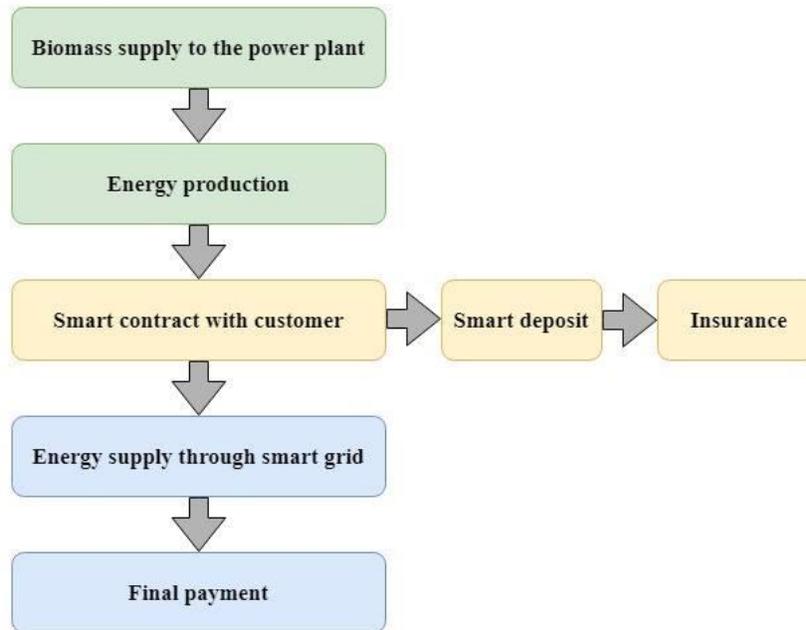


Fig.2. Blockchain technology-based energy distribution scheme

Source: Own evaluation

Based on the scheme provided we can see that in order to complete the deal smart contracts are signed between the biomass energy producer and the customer. The contract is based on smart depository which is a blockchain based monetary system expressed in cryptocurrency. If the transaction is completed the amount is returned to the business subjects and in case of failure it is allocated to the injured party. Both popular cryptocurrencies and currency spent by the business subjects may be used. When the transaction is confirmed with the smart depository the energy is provided to the consumers in real time. This is rounded up in the phase of final payment and the essence of it is that the producer can take back his deposit after he proves that the energy is already provided. The structure provided significantly increases the level of transparency within the transactions, eliminates several traditional transaction execution levels, speeds up the accounting process and that allows faster execution of environmental decisions – removal of biological waste, clean the lowland greenery and water bodies. Afterwards electricity is produced from the waste is realized in real time.

Processes are more complicated and take longer in traditional energy business. It is related to the lack of control in real-time and deposit system, also inability to quickly respond to changes in demand. Furthermore, the maintenance and communication using existing information technology is more expensive compared to blockchain development. After transaction is completed it is also important to confirm it with a purchase-sale act. Blockchain technology can also prevent from cases of fraud, eliminates the possibility of fake orders used to avoid taxes.

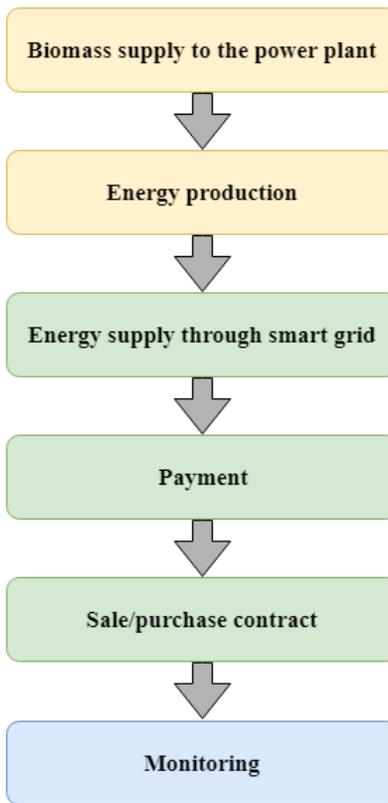


Fig.1. Traditional biomass trade structure

Source: Own evaluation

Blockchain technology-based biomass clusters would become more efficient, if would be possible to plan production more accurately simultaneously increasing the level of sustainable development within the region. Seeking to achieve synergic effects it is necessary to digitize the sales and accounting processes. That would not only create an effect on economy but would also save renewable resources thus improving the environment. This would reduce air pollution that is caused by imbalanced supply of fuels and physical expenses that occur due to excess bureaucracy and agreement handling. Traditional biomass distribution system is limited and impedes the possibility to essentially increase the efficiency of the processes and save resources. A cluster that is based on the blockchain technology is enabled to seek direct contact with the customer using intermediate distribution structure to provide the service, but not a mechanism that would generate the demand-supply flows.

Conclusions

Biomass cluster activity can be a suitable medium to develop blockchain technology. Key areas that could be digitalized are: transaction accounting, payment and deposit mechanism, transaction security verification. Blockchain technology allows increasing the pace of sustainable development growth because in this case natural resources would be saved and conditions for more efficient utilization would be created. The technology contributes to the growth of sustainable development as it allows calculating the energy demand in real-time, distribute the orders and supply energy faster to consumers. Comparing traditional biomass sales structure with blockchain structure it is notable that the latter is more flexible, less time consuming, improves the monetary flow and saves resources. Energy is supplied based on real-time demand data and that allows to adapt key

principles of Industry 4.0 concept – production is personalized and based on real-time demand. The use of biomass reduces air pollution and the blockchain helps multiplying the primal positive effect of biomass usage.

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CONFLICT RESOLUTION APPROACHES TOWARDS SMART SUSTAINABILITY OF INTERNAL RELATIONS*

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Abstract. Each country has to be able to develop efficient economic policy, facilitating sustainable economic development of national economy. In order to devise such policy, development patterns of a country have to be known, external threats indicated and various scenarios of their impact has to be foreseen, their impact forecasted and discussed (Tvaronavičienė, 2018). Conflicts within the environment of international relations, whether these are domestic or interstate, have become one of the most intensely perceived security problems of the contemporary world. Their nature is usually violent, accompanied by human casualties, which may escalate to humanitarian crises and may cause enormous material, population and ecological damage. Regions in conflict are the source of population migration, increasing pressure and they become a suitable environment for the formation of radical and terrorist groups. The destructive force of conflicts causes an economic decline of countries and, thus, increases the differences between stable regions and countries and those regions and countries with ongoing conflicts. The resolution and prevention of conflicts within international relations is a multidisciplinary approach, which draws on psychology, sociology, mass communication, development studies, studies of international institutions and political science, security studies and, in particular, on the study of international relations. In this contribution we present proposal of conflict resolution approaches due to the smart sustainability in the content of social systems, especially in international relations.

Keywords: conflict; security; negotiation; facilitation; mediation; arbitration; adjudication; conflict resolution

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JEL Classifications: K10, K22, K33

1. Introduction

The fundamental changes in the global security environment, emerging after the end of the Cold War and the fall of bipolarity, have brought, besides their uncontested positives, also numerous negatives. While the positive side of this process has become manifest mainly in and through the removal of the threat of war between two antagonistic military-political groupings – the North Atlantic Treaty Organization and the Warsaw Pact, as well as the threat of a possible nuclear missile apocalypse, the negative side has increasingly manifested itself through diverse forms of various security threats, for example terrorism, organized crime, massive illegal migration, etc. The emergence of new, especially asymmetric security threats and their proliferation, combined with massive transformations in the political, economic, social, environmental and technological fields, have provoked in the world not only integrating but also disintegrating tendencies (Ivančík, Nečas, 2017; Becerra-Alonso et al, 2016), that have resulted in many crisis and conflicts (predominantly civil wars) throughout the world. Conflict is the most intense security issue that has so far not a uniform definition (Kazanský, Šestáková, 2017).

The main subject of this part is to briefly outline how conflicts are solved within international relations. When considering conflict resolution as an individual branch, we proceed from various scientific disciplines such as international relations, peace research, security studies, etc. The main objective of conflict resolution is a purposeful, constructive and productive transformation of conflicts, aimed at minimizing the use of violence, overcoming antagonisms between the sides of conflicts and maintaining the conflict solving in a long-term perspective. Conflict resolution also involves creating short-term and long-term strategies, studying the interests and goals of the participants, their behaviour, way of negotiating, their surroundings and the environment of the conflict, third parties involved, etc. Other studied factors are the way agreement can be reached and realized, and also long-term maintenance of the agreement. An important feature of conflict resolution is also creating ways and methods of effective prevention of conflicts, both violent and non-violent. The starting point for an effective prevention and resolution are the research and analysis of conflicts, their characteristics and individual phases that are defined in the next part.

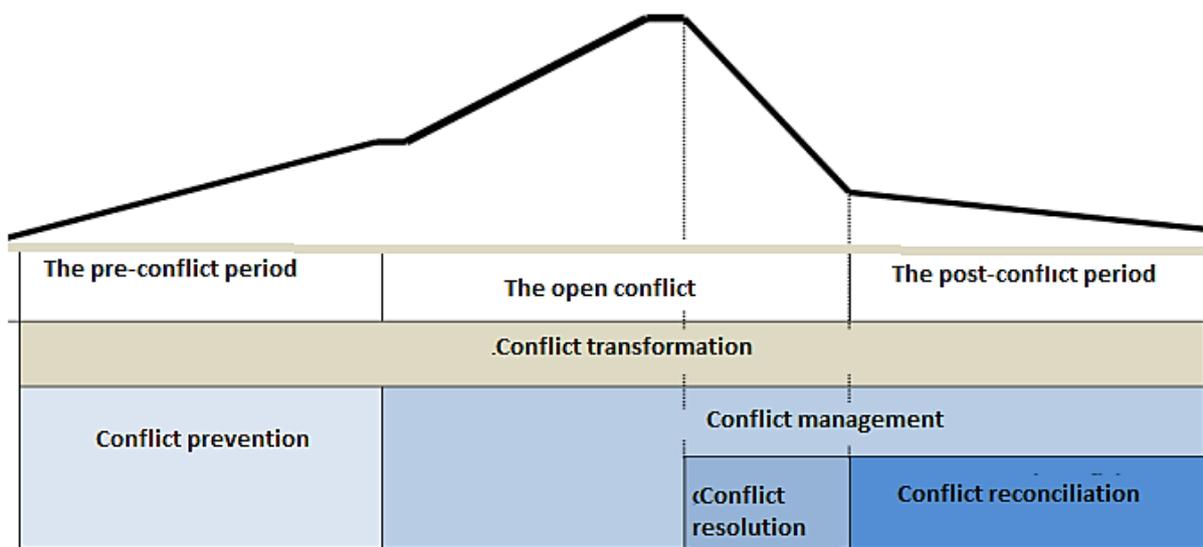


Fig. 1. Continuity of actions associated with conflict resolution
 Source: Hofreiter, 2008

To analyse conflicts correctly we must recognize differences between the terms ending the conflict and resolving the conflict. Not all the ended conflicts can be considered resolved. From the standpoint of the conflict solving

process, we must determine all the actions and processes that are part of ending and resolving. Actions that take place within the development of conflicts are shown in figure 1. In course of the conflict development phases, we can identify and define these actions (Hofreiter, 2008):

- 1) conflict transformation,
- 2) conflict prevention,
- 3) conflict management,
- 4) conflict resolution,
- 5) conflict reconciliation,
- 6) building peace.

Conflict transformation is a complex term representing activities and processes that lead to changes of various typical attributes of conflicts by means of solving the original causes of a particular conflict during a longer period of time. This term is used to determine both the process of conflict and its ending. It includes processes such as conflict prevention, conflict resolution and it is also related to conflict reconciliation.

Conflict prevention represents the activity before the formation of a conflict. Its goal is to identify the situation and circumstances which could escalate into a violent conflict, reduce the amount of emerging disputes, prevent escalation into violence and eliminate the causes of disputes before there is a possibility for an armed encounter. Conflict management includes actions, which lead to limiting, moderating and suppressing an open conflict, so that negative and disruptive displays can be prevented. Its goal is to end the conflict in a way that prevents escalation or repeated violence (Mischnick, 2007).

Conflict resolution can be generally characterized as an activity, which is primarily oriented on defining and studying the causes of a conflict. Another goal of conflict resolution is an examination of progress of the relationships between the parties involved. The goal is to reach agreement between the sides of the conflict and settle the problem, so that it would not become a basis for new disputes in the future. Waisová defines conflict resolution as a social situation, in which the participants of an armed conflict voluntarily choose to coexist peacefully or to solve the basic causes of incompatibility of their interests so that the violence can be stopped. This definition only concerns armed conflicts (Waisová, 2005). Hofreiter defines conflict resolution as a complex term indicating the fact that deeply rooted causes of a conflict have already been identified and transformed. As a result, the behaviour of the parties involved is not violent any more, the views are not hostile and the structure of the conflict has changed (Hofreiter, 2008).

2. Methods of conflict resolution

There are various approaches to conflicts, but only 4 basic ways of conflict resolution at the level of behaviour:

- 1) escape, which represents passive approach towards the conflict,
- 2) attack, which can be verbal, but might escalate into physical aggression,
- 3) manipulation, when participants try to influence their opponent by various means,
- 4) non-violent way of satisfying the participant's needs, which is straightforward and open.

The concept of conflict resolution prefers the last, non-violent possibility. The goal is to solve the conflict constructively, so that the requirements of all the parties involved are met. In this context, psychology recognizes the cognitive approach and works with functions such as the thought process, will, memory, rational choice. It is based on the fact that in social society conflicts do not occur. Philosophical approach prefers the idea of non-conflictual coexistence. In the case where a conflict emerges, the parties involved should not avoid and deny it, but at the same time, they shouldn't escalate it into a higher level. Conflicts should be dealt with in the early stages and an appropriate method of solving them must be found (Labáth, 1997). Kusá defines five basic conflict resolution methods and dependent resolution approaches (Kusá, 2005):

- 1) negotiation,
- 2) facilitation,
- 3) mediation,
- 4) arbitration,
- 5) adjudication.

The goal of each conflict resolution method is to allow the participants to eliminate their emotions, rationally consider the situation, decide on certain steps and approaches and make a particular, measurable and realistic agreement with their opponents.

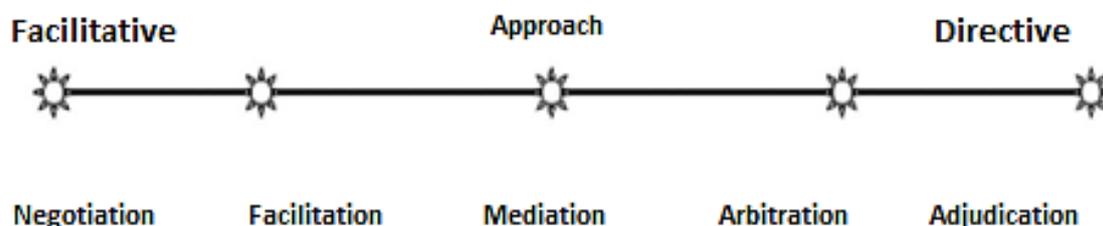


Fig. 2. Basic methods of conflict resolution
Source: Kusá, 2005

Agreement based on sustainability as a harmony of all the parts with the whole is the basic goal for each of the conflict resolution methods (e. g. Tvaronavičienė, Grybaitė, Tvaronavičienė, 2009, Tvaronavičienė, Grybaitė, 2012; Lankauskienė, Tvaronavičienė, 2012; Prause, Tuisk, Olaniyi. 2019).

Negotiation

The use of a conflict resolution method depends on the particular conflict stage. In the initial stage, parties involved are willing to come to an agreement and solve the conflict by means of negotiation. Sustainability in negotiations is a good balance of actions, proportionality associated with (Peleckis, Peleckienė, Peleckis, 2012):

- a) actions structure of negotiator,
- b) the timing of the negotiating actions,
- c) compliance of behaviour to actions of opponent (partner, the interviewer).

Immediate, alive chat in negotiations offers significant opportunities to provide for the interviewer the background of your position. The fact that it is not possible to repeat the conversation encourages negotiator to seek sustainability and systematic exposure to opponent, to use all opportunities given. For this purpose, the following negotiator's positions reasoning techniques are used (Peleckis, Peleckienė, Peleckis, 2012):

- proof arguments,
- counterarguments,
- bluffing,
- manipulation,
- persuasion,
- suggestion.

Negotiation represents an informal process, during which the sides of a conflict voluntarily hold talks about the possibility of its resolution. Mutual agreement about the suggested solution is needed. The process can be formal in some cases. This depends on the approach of the parties involved. A typical feature of negotiation is the absence of any judge, mediator or a third party. See figure 3.



Fig. 3. Negotiation
Source: Mischnick, 2007

Negotiation is an interpersonal or inter-group approach, which can function on multiple levels (Kusá, 2005):

- 1) personal level,
- 2) organization level,
- 3) international (diplomatic) level.

The goal of the negotiation process is to create and build relationships, by which the participants try to come to an agreement about the issues of individual or mutual interests. Conflict participants create a direct connection – verbal, written or using a negotiator. The sides to the dispute define the subjects of discussion and decide how the dialogue will run. They also hand each other information and messages, discuss their goals, interests, possible needs and demands, create possibilities for conflict resolution and analyse their practicability.

Negotiation is a communication process and one of the participants' goals is to influence the opponent and gain benefits. The force of negotiation is defined by the ability to influence the other side's decision. The negotiation process is divided into three basic stages (Mischnick, 2007):

- a) 1st phase: *Preparation*. In this stage, it is essential to analyse the conflict situation and summarise all the information. The object of the analysis is also to determine interests, goals and needs of the parties involved. The next step is to consider possible results of negotiation and pick the best option available. The last part of the preparation stage is to establish contact with the opponent and mutually agree about the place and process of negotiation. This agreement involves basic rules and the object of the negotiations.
- b) 2nd phase: *Interaction*. In this stage, the key is to analyse the situation from various points of view and agree about an accurate definition of the problem. Interaction also represents evaluating and defining the priorities of different possibilities according to the interests and needs of parties involved, and a choice of the best alternative or combination of alternatives that satisfy the interests and demands of the parties involved.
- c) 3rd phase: *Conclusion*. The main goal of the negotiation process is to achieve a binding settlement between the parties involved, which would satisfy their legitimate needs. The goal is not to come to a state in which one side adjusts to the demands of the other, but to achieve a willingness of the participants to combine possibilities trying to find an adequate solution. In the case where a negotiator represents a large group, he or she must have an unequivocal mandate from this group and also the conditions of their mutual communication must be clearly stated. The conclusion stage also involves creating an action plan for the parties involved and a plan of evaluation, control and agreement.

We must stress that negotiation is considered to be one of the basic tools of international conflicts and disputes resolution. Contemporary processes of globalization affect the density of interactions between countries and societies. The frequency and depth of these interactions are causes of conflictual relationships' emergence. Subjects of negotiations are, e.g., the questions of trade policy, economic policy, investments, natural resources, environment, etc. An effort to solve the questions of war in a peaceful way, by means of international negotiations and diplomacy, has been a characteristic feature for the period since World War II. The quickly

increasing number of international institutions in the 20th century was another impulse for the development of negotiations. The talks between these institutions were also essential for the development of this process.

We must also stress the fact that a main correct approach does not exist. There are just less effective and more effective approaches, which differ according to different factors of the context. The importance of negotiations when solving international conflicts (inter-state, internal or civil) has been apparent in the last decades. It follows that an increased interest for this conflict resolution method is shown among the experts (Galtung, 2004).

Facilitation

If the conflict is not being solved and the participants insist on their standpoints, being unable to reach appropriate communication, the conflict escalates and its resolution is impossible without the entry of a third – neutral party. In this stage of a conflict, an appropriate tool is facilitation, i.e. creating conditions that allow the participants to communicate. Successful facilitation means the negotiating environment, rules, time horizon and process of discussion, so that it is possible to overcome opinion, interest or value barriers between the parties involved (Kusá, 2005).

Facilitation is a process, which creates an environment for an effective and secure dialogue about complex issues. It is a structured method, which should simplify the negotiations despite polarized standpoints of the participants. A basic principle is to use mutual consensus in each step. Its goal does not have to solve all the disputable questions. It is considered a success is if the opponents are able to listen to each other, understand the position of one another, openly showcase their interests and describe their views of the situation.

Facilitation is used in different environments, e.g. local communities, educational institutions, corporations, etc. (Mischnick, 2007). Facilitation is a controlled negotiation with the presence of a neutral expert, who helps the participants coordinate the dialogue. The facilitator is a part of the system the conflict emerged in. He helps the sides to analyse problems, find solutions of disputes and ways of using them. The facilitator tries to make the dialogue more effective and helps find consensus, without using ultimatums. A good facilitator does not solve conflicts, but simplifies the communication. He does not intervene in the subject of discussion, but ensures its fluency and direction, allowing all the parties involved to have equal opportunities to influence it. The presence of a facilitator can be enough to direct the dialogue so that it could be successful. Facilitation can help solve the conflict or make it just a "disagreement". Then negotiation can then follow (Labáth, 1997).

Mediation

When a conflict is dynamically developing, strong polarization may occur, one side refusing to communicate with the other. In such case we distinguish separation (partial contact interruption) and isolation (complete contact interruption). In this situation, negotiation is impossible as the sides refuse to communicate. Facilitation is not possible either, because an environment for communication between the participants cannot be created. Disputes between parties that refuse to mutually negotiate can be solved by mediation. An effective solution is to involve a mediator in the talks (Labáth, 1997). The scheme of mediation can be seen in figure 4. The term "mediation" originates from Latin *mediato* – arrangement. The term "mediation" in international law means any process, involving the victim and the offender of the criminal offense, who, freely and without any influence, agree to eliminate the problems, caused by a criminal dispute, acting with the help of a neutral third party named as mediator (Jefimovs, 2018).

Mediation represents an assisted negotiation. It is an organized process in which a third party with no decisive authority helps the sides of a conflict to negotiate a mutually acceptable agreement. The basic goal of mediation is creating or re-creating communication channels between the conflict participants using a mediator. This means a systematic emphasizing of communication by means of the mediator and not directly between the sides of a conflict, at least in the stages focused on history. This approach crates a communication interstage, and the opponents can then seek solutions via the mediator. If the conflict is in a stage of isolation, parties involved do not need to meet at all (Mischnick, 2007).

Mediation functions strictly according to the principle of having permission from both sides for each step of the process. A mediator does not make individual decisions on participants' behalf, but helps the opponents find a solution on their own. In certain cases, the mediator gives impulses, propositions or formal suggestions for reconciliation of the dispute. First of all, the mediator is a "procedural expert" who helps the parties involved determine the program of negotiations, define and re-frame ideas, lead the dialogue more effectively, find a common interest and, of course, reach a mutually acceptable agreement. From the historical point of view, the original and "natural" mediators were priests, shamans, elder members of the tribe, etc., because they had the trust of the community, which is an important feature even in today's use of mediation. A mediator takes action in situations of disagreement, misunderstanding, armed attack and other disputes where considerable mistrust exists between the participants. That is why it is important for the mediator to represent a trustworthy link between the opponents. Another important feature of successful mediation is the ability to persuade (Galtung, 2007).

The mediator also has to be able to create a more productive dialogue than the conflict sides can. To achieve this, mediators help the participants with mapping the facts, show empathy and impartiality to both sides and help them create new ideas. Mediators also apply strategic abilities and use persuading to achieve a state, when the participants moderate their extreme positions (Mischnick, 2007).

The result of a targeted and successful mediation is a consensus, which the participants accept explicitly and which is satisfactory for each one of them. One of the goals of mediation is to make the individuals or groups involved in a conflict active participants of negotiations. All the sides should actively seek agreement, which is acceptable for everybody and which satisfies the goals, needs and interests of all the participants. The goal of active contribution to the mediation process is to divert attention of the participants away from other impulses, which could lead to escalation of conflicts, e.g. strikes, armed attacks, legal disputes, etc. The goal of mediation is to allow the parties involved to meet, to try to improve mutual relations and understand problems, which should lead to avoiding polarization and creating space for more discussions and negotiations. The result of a successful mediation is an agreement, confirmed by all the parties involved. The agreement should also specify the ways of how given goals have been accomplished (Kusá, 2005).

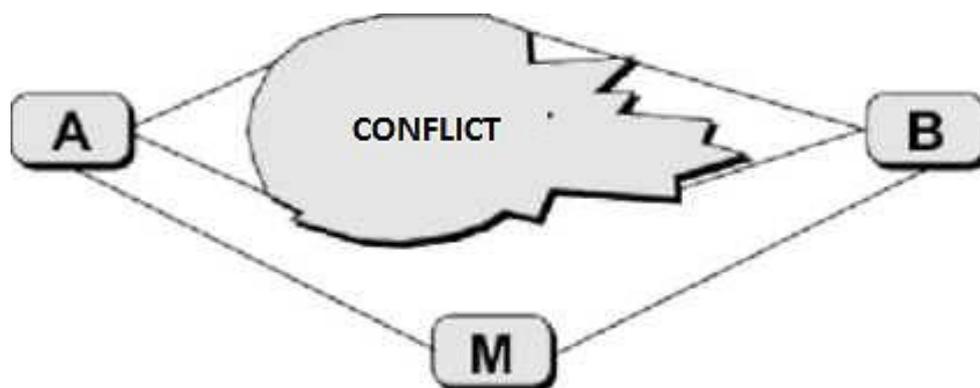


Fig. 4. Mediation
Source: Mischnick, 2007

Mediation is widely used in all kinds of discussions considering complex problems of public policy or international conflicts. In case the conflicts are seemingly unsolvable, there is still a possibility of solving them using mediation. Mediation is extremely important in long-term, deep-rooted conflicts, because solving such conflict is not possible without external help. Even in situations when it is impossible to right all the wrongs, mediation is useful for solving individual aspects of a wider conflict.

Mediation is a highly effective method used for conflict resolution achieving a high success rate in particular cases. Use mediation variations is more effective than to apply traditional litigation (e.g. Jurkevičius, Bublienė, 2017; Šišulák, 2017; Limba, Šidlauskas, 2018; Kordík, Kurilovská, 2018).

Arbitration

Arbitration is an alternative, traditional way of dispute resolution. We divide the sides of conflicts to the winning and losing ones. Historically, disputes were most often solved by a directive approach – based on using power or authority. The resolution principle has been the same whether it was a tribal meeting of council of elders, decision of a reeve or a king. The third neutral side always used its authority to pronounce obligatory verdicts. It decided how the case would be solved according to the subject of dispute and evaluation of evidence and witnesses. It all works the same way until today. Traditional conflict resolution methods are nowadays represented by legal system, including the activities of police department and the institute of imprisonment (Kusá, 2005). An arbitrator is named – either by a court, or by other adjudicative authority. The main task of an arbitrator is to hold an interlocutory hearing of a case, evaluate the evidence, arguments and testimonies, and deliver a verdict within given competences. The arbitrator can be generally authorized to investigate, mediate, make recommendations, etc. Letting an independent, third party decide about the subject of a conflict is a tradition older than the law itself.

Arbitrational lawsuits exist in all communities and civilizations. The final verdict of an arbitration is obligatory, but in some exceptional cases may just have the nature of a recommendation. A characteristic feature of an arbitration is its voluntariness. This means that the participants should agree about the means of solving the dispute. Another typical feature is the greater possibility to influence the sides' decisions by means of a higher level of informality in front of the court of arbitration. The approach towards conflict resolution is directive. The arbitrator hears the sides of the dispute and decides the most effective possibility. Arbitration is used in different sectors, mostly in the commercial sphere, but it is also institutionalized at courts. At the international level, arbitration is a commonly used conflict resolution method, e.g. in situations after civil wars. Arbitration tribunals were established e.g. in the countries of former Yugoslavia (The Badinter Arbitration Committee, which consisted of five constitutional court judges from the countries of the European Economic Community. The committee decided about the accession of successor states to the EEC), in cross-border disputes, e.g. between Eritrea and Ethiopia (Eritrea-Ethiopia Boundary Commission of the Permanent Court of Arbitration in The Hague), or between Slovenia and Croatia (about the Slovenian corridor to open sea) (Kusá, 2005).

Obligatory and most often used arbitration mechanisms are:

- a) Ombudsman – public human rights protector. The foundations for this institution were laid in Sweden, back in the 18th century. Since then, it has spread into more than 70 countries around the world. The role of an ombudsman is not only administrative. The institution of ombudsman serves as a tool to solve conflicts in other than judicial way (Kusá, 2005). "*The Public Protector of Rights is an independent body which, protects basic rights and freedoms of natural and legal persons in proceedings before public administration bodies and other bodies of public authority, if their conduct, decision-making, or inaction, is in conflict with the legal order*" (Constitution of the Slovak republic, 1992, art. 151a).
- b) Court of arbitration – Arbitration represents an out-of-court settlement of disputes assisted by judicial officials. The goal of the arbitration courts concept was to decrease the number of lawsuits and accelerate the decision-making process in particular cases. Before the beginning of arbitration, the opponents sign an arbitrational contract, where competences of the court of arbitration are defined. Courts of arbitration use a combination of both public and private law. The final verdict is obligatory and in this case no corrective devices are permissible. The nature of arbitration is voluntary and it represents an alternative method of conflict resolution.

The institute of ombudsman along with the courts of arbitration represent a relatively respected authority in democratic countries. Both institutions are consensual methods of conflict resolution, where the final decision is pronounced by a third party (Kusá, 2005).

Mediation-arbitration hybrid (also referred to as med-arb) is a relatively new alternative dispute resolution method known since the 1970's. It is argued that this method combines the advantages of both mediation and arbitration and eliminates most of their disadvantages. In recent years a lot of variations of mediation and arbitration applied together appeared (Kaminskienė, Žalėnienė, Tvaronavičienė, 2014):

- at first mediation, if unsuccessful, then arbitration; arbitration begins but certain degree of mediation is allowed;
- mediation is applied to deal with particular issues, arbitration with others,
- mediation begins, then arbitration is addressed to the issues on which agreement was not reached, then mediation re-applied;
- the mediation is carried out and if there is a failure, then the mediator is asked for an “advisory opinion”, which is mandatory, unless any of the parties within a period of time vetoes it.

Med-arbitration, as we have seen from the above, combines many possible variations and is quite flexible procedure. In principle, both methods of alternative dispute resolution (mediation and arbitration) in terms of sequence and procedural specificities depend on a will and general consensus of the parties, and on the selected mediator's practice as well (Kaminskienė, Žalėnienė, Tvaronavičienė, 2014).

This controversial hybrid method combines the ultimate decision-making guarantee (this is achieved through arbitration), and the subtle management of delicate issues, which ensures mediation. Basically med-arbitration eliminates the biggest disadvantage of mediation – final decision is guaranteed and there is no need to litigate (Kaminskienė, Žalėnienė, Tvaronavičienė, 2014).

Adjudication

It represents a form of conflict resolution with the highest obligation level. It involves deciding about the subject of dispute by a third party, which has the competence to deliver obligatory verdict. Adjudication can take place in an out-of-court way, but a judicial lawsuit is its most common form. It is a structured and formal process, which is not based on voluntary participation. It is a situation, when one side is the winner of the lawsuit, and the other loses. Adjudication is based on competition between the opponents.

It represents one of a few involuntary forms, where the opponent cannot choose a different way of dispute resolution, neither avoid it. In the stage of a higher conflict escalation level a lawsuit can be unconditional and beneficial. Adjudication is a legal process, in which the lawsuit is judged according to the evidence and argumentation of advocates, while the rights and obligations of the sides of a conflict are taken into account.

The trial is highly structured and it follows the law and exact procedural rules. The plaintiff, who initiates the lawsuit, demands legal rectification of the situation. If successful, the judge decides in favour of the plaintiff and pronounces a verdict, which contains exercise of the law, right for compensation, punishment and sanctions of the opponent, and a court order prescribing or forbidding particular action or declarative approach of the opponent, all to prevent the emergence of more conflicts (Kusá, 2005).

3. Alternative conflict resolution

Based on conflict research, it is obvious that disputes are best solved during their latent phase, if there is no escalation. However, it is not possible to do in all cases. Because of this, it is also necessary to define alternative methods of resolving conflicts that have already erupted. The methods of dealing with conflict situations, as well as individual conflicts, differ. We can split them up into several groups.

- 1) The method of violence – violent suppression of conflicts.
- 2) Escaping or avoiding the conflict.
- 3) Game theory, as a way of resolving conflict situations.

The method of violence

This is an extreme way of conflict resolution where one of the parties involved in the conflict shows an evident high degree of preparedness. The basis is the determination or belief that force or the threat of force needs to be used in order to achieve one's interests and needs. The objectives of violent conflict suppression are, for example, (Hofreiter, 2008):

- a) forcing conflict resolution, if the parties involved don't address it themselves,
- b) preventing or punishing aggression against a sovereign state,
- c) restoring a legitimate government, which was illegally overthrown,
- d) preventing the supplying of weapons to the conflict region,
- e) protection of the population against genocide and other violent acts, committed by their own government or as a result of an internal conflict,
- f) restricting the access of the parties involved to resources that would allow them to continue or escalate the conflict,
- g) protecting the democratic regime against internal and external threats.

It is necessary to lay down certain conditions for using a method in which a conflict is violently suppressed. If one party has more resources and a decisive superiority of forces, it is possible for them to use this superiority to their advantage when dealing with the conflict. The need for an immediate solution to the dispute, in the event of an emergency situation, may be another case (e.g. the deployment of the armed forces and the police in situations where it is necessary to separate the opposing parties). Another example is the need to adopt and enforce an unexpectedly violent (but necessary) resolution of the dispute, which the opposing party will see as negative. The condition in the choice of a violent conflict resolution occurs in the case of a conflict situation which could cause significant material or humanitarian damage, or in the event that the measures are associated with the provision of vital interests. In this case, a violent settlement of the dispute is seen as legal and in accordance with applicable law. In the case of obvious destructive activities which threaten a party involved (e.g. the state) and its interests, the method of violence is adequate (for example during violent demonstrations of anti-globalists, eco-activists, during riots, violation of public order, destroying or damaging of property).

The deployment of regular armed forces, during Peace Support Operations (PSO), to areas with conflicts may also be considered as a violent solution to violent domestic and international conflicts (Ivančík, Jurčák, 2013). PSO are multifunctional operations, co-ordinated by military and also civilian organisations on the basis of impartiality. They are divided into: operations for conflict prevention, peace-enforcement operations after the emerging of a conflict, peace-keeping operations, peace-building operations and humanitarian operations (Hofreiter, 2008). It is the violent resolution of a dispute by a third party, which is usually represented by the international community, which has an armed military force with an appropriate mandate to settle the conflict.

Another category of operations which use the deployment of military forces are the so-called Peace-enforcement operations (PEO). The consent of the parties involved in the conflict is not required to begin this type of operation. Such activities represent violent operations, consisting of the deployment of armed units in a direct struggle to protect the civilian population affected by the conflict. Its goal is to eliminate armed violence and establish peace. Within the framework of the measures defined in the Charter of the United Nations, peace-enforcement is the highest form of involvement of international peace-enforcement units in conflicts.

If the situation is sufficiently stabilized, peace-enforcement activities are replaced by a peacekeeping activities. This category includes peacebuilding operations and peacemaking operations. The mandate of the units used in such operations contains provisions identical to those of peace enforcement because, in the case of stabilisation it is, in some cases, necessary to use force in order to maintain a peaceful situation. These units have a mandate under Chapter VI, and VII of the Charter of the United Nations. In some cases, their mandate is defined in international agreements (Hofreiter, 2008).

The use of force or the threat of its use is an extreme, though not always effective, final solution to the conflict. Coercion of the opponents in the conflict to end their violent acts against each other does not mean the removal

of the subject of the conflict and the causes of the dispute. It is not impossible for the conflict to begin anew, if the power causing its forced cessation stops being active.

Escaping – avoiding the conflict

If one of the parties involved in the conflict is not sufficiently prepared and does not have the ability or the means to solve the dispute. They then usually use the method of escaping or avoiding the conflict. In this case, the party involved is not able to deal with the situation and communicate with its opponent about the possibilities of settling the dispute. From the perspective of one of the parties involved, escaping from the conflict is a relatively easy way of resolving it. The essence is ignoring the conflict situation, denying it exists or leaving the area where the conflict takes place. A party involved in the conflict decides not to take any constructive steps towards resolving or changing the situation.

In the initial stage of the investigation of this alternative of conflict resolution, it may seem negative because of the parties' passive approach. With a deeper analysis we can also define some positive aspects and advantages. For example: escaping or avoiding the conflict is a quick way of dealing with the situation, and it does not require intellectual, material or large financial resources; this method makes it possible to avert or delay the conflict, if it's irrelevant to or not interesting enough for one of the parties involved. The downside of this approach is that an escalation of the conflict may occur because the root cause of the conflict is not removed but preserved. Delaying the resolution of the dispute may lead to a deepening and escalation of the conflict, instead of its resolution.

The use of the method of escaping or avoiding a conflict is subject to a number of factors. The method is justified if there is another relevant and constructive conflict that needs to be addressed as a priority and, if not solved, does not result in negative consequences. If the party fails to address (or avoids) the unimportant causes of existing conflicts, it allows the party to save their resources and strength and focus on important issues and disputes. The method of escaping is also used in a situation where the opponent does not have sufficient information and, given the seriousness of the conflict, acquiring it would be extremely complicated and disadvantageous in terms of cost and resources. Another example of this method's use is when the opponent has great superiority, which he can use to achieve a quick victory in the open rivalry.

Certain features of behaviour and specific activities of the parties involved are typical for this method. They include, for example, hiding information necessary to resolve the dispute in order to prevent the escalation of the conflict as a result of a leak of sensitive, strategic information. Another typical feature is the use of a variety of arguments to delay the resolution of disputes and problems that are the causes of the conflict. A characteristic manifestation of behaviour is refusing to acknowledge that the causes of the conflict truly exist and relying on the dispute being resolved without the active presence of the parties involved (Hofreiter, 2008).

The Game Theory

It represents a formal, rational, mathematical method of the study of decision-making in conflict situations. It analyses the communication and decision-making of the parties involved in negotiations and the conflict itself. It applies the "MINIMAX" principle (minimizing costs and maximizing profits) into the theory of decision-making. The basis of this principle is that every party has correctly defined objectives, will act according to the rules and means given, and will not wrongly choose their goals. There are two approaches in the game theory:

- a) cooperative games, where the parties involved communicate and make agreements relating to choosing their strategies,
- b) non-cooperative games, where reciprocal agreements are not possible and communication may or may not exist (Drulák, 2010).

The game theory is divided into three basic models:

- 1) a game with opposing interests,
- 2) a game with identical interests,

3) a game with mixed interests.

Game with opposing interests.

In case of games with opposing interests, we can talk about a zero-sum game. The parties involved mobilized their resources and forces in order to enforce their interests and goals and to prevent their own defeat and failure. The interests of the opponents in the conflict are in contradiction and each opponent tries to gain absolute superiority over the others, and seeks to force them to deal with interests, which are contrary to their own. In the game with opposing interests, the result must be a complete defeat of one of the parties involved. One party may profit only at the expense of the other (Krejčí, 2014). This non-cooperative strategy is shown in Chart 1.

This strategy is used in conflicts, where the parties involved aim towards a confrontation and are in a conflict to gain specific positions and maintain them. The characteristics of this approach are (Hofreiter, 2008):

- the opposing parties in the conflict seek to maximize the realization of their objectives, regardless of the objectives and interests of their opponent,
- the goal of the parties is to uncompromisingly refrain from any concessions, or to hinder the loss of their gained position,
- opponents wish to remain on their achieved or gained positions and aim to defend them without compromise,
- the conflicting issues form the borderline factors of the conflict, differences between the opposing parties (there is no willingness to change these differences),
- the behaviour and activities of the opposing parties are aimed at the opponent, his discredit, elimination, and not towards the resolution of the dispute.

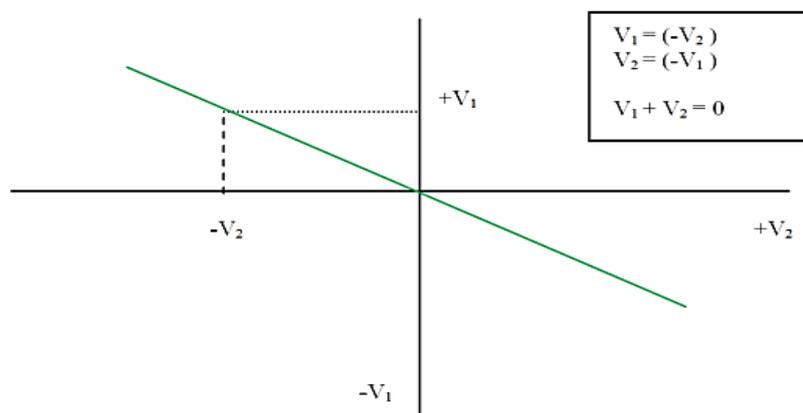


Chart 1. Vector of profit of the game with opposing interests
Source: Krejčí, 2014

Game with identical interests

The second model of the game theory is the game with identical interests, the non-zero-sum game, which is a cooperative way of resolving conflicts. In this case, the parties involved are open and willing to accept unilateral concessions or to adapt. Adapting does not mean a clear victory for the opposing parties, but neither is it a loss. A party that retreats from its position will partially be subject to loss, but it will also gain values, or keep its positions which it maybe would have lost during an ongoing dispute. A graphical representation of the game with identical interests is shown in Chart 2.

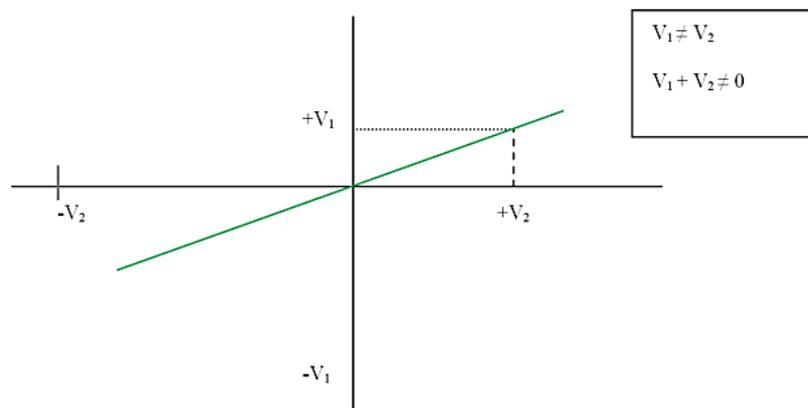


Chart 2. Vector of profit of the game with identical interests
 Source: Krejčí, 2014

The following types of conflict situations typically use the game with identical interests (Hofreiter, 2008):

- An obvious error committed by one of the parties involved in the conflict becomes apparent during the conflict. Escape is impossible, as is using force to solve it. For an opponent who has committed the error (such as incorrect, incomplete or misleading information), it is an alternative, which they can use to end the conflict with honour.
- If the planned concessions are too severe for one of the parties involved and is incomparable with their relevance to the second party, it is possible to adopt smaller, less significant concessions. This will eliminate the possibility of the conflict escalating and also saves the strength and resources of the opponents.
- If there are other major crisis situations which may occur in the near future and which will require the parties to conserve strength and resources. Partial concessions allow the diverting of attention from solving irrelevant problems, saving resources and focusing on averting a possible danger or expected crisis situation (e.g. in anticipation of a war, it is beneficial to solve smaller conflicts, even at the price of having to take concessions and, thus, gain the support of potential allies for the next conflict). Concessions should be taken whenever their refusal could lead to bigger losses and damage, or other disadvantages for a party in the conflict.

Game with mixed interests

The third method of the game theory is the game with mixed interests, or a non-zero-sum game, which is a cooperative method. This method is one of compromise during conflict resolution and of mutually advantageous cooperation. When using this method, the parties involved will have their interest and needs satisfied adequately and will gain the same benefits and the same losses. This method is displayed in Chart 3.

A compromise represents a kind of mutual consent, based on the mutual correction of the positions of both parties in relation to solving the issue and on finding a mutually advantageous position against the issues in question (Hofreiter, 2008).

The above described method may be a reliable basis for a long-term cooperation. It is most commonly used in democratic societies and it is considered to be a classic and model way of resolving conflicts. It satisfies the needs of both parties, due to a series of mutual concessions and mutually beneficial agreements.

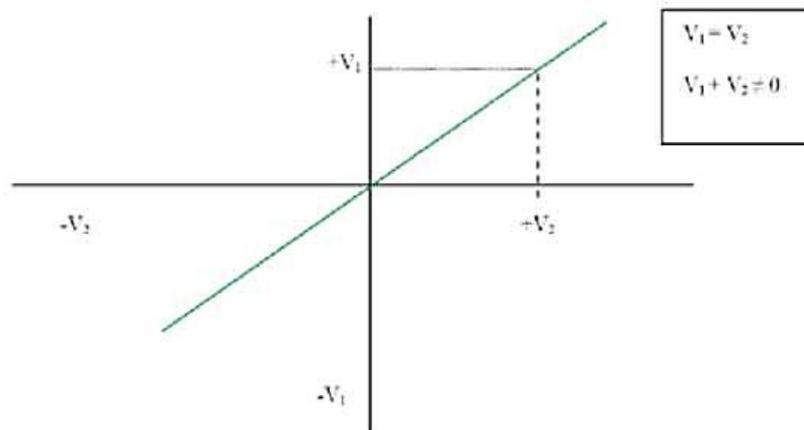


Chart 3. Vector of the game with varied interests

Source: Hofreiter, 2008

Mutual conversations, discussions or negotiations, which aim to establish the common interests of the parties involved, are important when using this method. The negotiations conducted in order to reach a mutual agreement or compromise of opinions about solving the disputing issues, are conducted while respecting the interests of the parties involved.

This method assumes that the parties involved in the conflict will show a mutual openness toward positive cooperation. Prerequisites for a successful compromise solution to the conflict are, for example (Hofreiter, 2008):

- The parties involved analyse the issues and seek solutions and, at the same time, demonstrate partnership instead of rivalry.
- The parties involved in conflicts search for mutually beneficial variations of dispute resolution.
- In order to achieve a compromise, it is necessary to understand the opinion of the opposing party and accept alternatives in the search of a compromise solution.
- The final consensus must respect and meet the interests and requirements of all parties involved in the conflict to a maximum extent.

Conclusions

The resolution and prevention of conflicts is most commonly understood as a part of the study of international relations, which touches upon the aforementioned disciplines. The study, analysis, and research of the theory and practice in the field of conflict resolution and prevention has had its place within the framework of international relations on a global scale for several years now. However, inside of the Slovak academic and professional environment, these issues have been established only recently. This fact made us choose these issues as the subject of our work. This work may be used in the study of several scientific disciplines but mainly when studying the issues of conflict prevention and resolution within the context of international relations.

The goal of this publication is to provide a basic synthetic theoretical analysis of conflicts, methods employed to resolve them and the ways in which they may be prevented. The work is an introduction to these issues. It attempts to include a wide range of topics dealt with by the study of conflict resolution and prevention. The included deeper analysis of the issue of conflict prevention is a key part of the work. Emphasis is put on the theory and practice of conflicts, due to the importance of conflict escalation prevention in the pre-conflict phase, the phase of conflict transformation and during the process of post-conflict reconstruction. Conflicts became more dynamic in the 21st century. This change occurred not only with the parties directly involved in conflicts, but also the parties involved in the resolution of conflicts, where we can find many different units, in addition to states. Because of this, the bulk of the work is focused on conflict prevention and resolution with the use and

participation of national, regional and supranational parties involved. However, the current dynamics of international relations moves the examined issues forward too rapidly, which is why the work is a reflection of the state of events, which were current during the preparation and implementation of submitted facts.

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LOCAL WISDOM IN RURAL MICROFINANCE: A DESCRIPTIVE STUDY ON VILLAGERS OF EAST SUMBA *

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Abstract. Developing microfinance in rural areas by considering local wisdom in Sumba-island becomes an urgent issue due to limited access to formal financial services experienced by the majority of the villagers. This study aims at describing the forms of local wisdom in rural microfinance to overcome problems of access to financial services. This is in line with the government program of financial inclusion for villagers in the remote area. This study uses the qualitative method in the form of a case study in Mbatakpidu village in East Sumba region. Data was collected through observation and focus group discussion with community leaders and several non-government organizations. The findings show the existence of local wisdom in saving and investing by the villagers to overcome the limited access to formal financial services. In addition, there is evidence of village development using a bottom-up approach by considering the local wisdom to reduce poverty through microfinance development. Thus, culture-led development might be an alternative policy for the local government in developing microfinance.

Keywords: Microfinance; Local Wisdom; Sustainable Development; Sumba

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JEL Classifications: G23

1. Introduction

The World Bank (2015) study revealed that Indonesia was the country with the lowest level of ownership account in Southeast Asia (36.1%) whose account holdings were concentrated in urban population. Ironically, 50.21% of Indonesians in 2010 were in rural areas (Badan Pusat Statistik, 2013). Thus it indicated the low level of facilities and accessibility of banks especially in rural areas (Citradika, 2018). To address the funding needs of rural

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communities, the microfinance model can be an alternative to the limited accessibility of rural communities to banks (Mersland et al., 2013) and poverty alleviation (Hulme, 2000; Kabeer, 2005), which is an instrument of society economic empowerment. This is also in line with the government's financial inclusion program. According to Irmawati, Damelia and Puspita (2013), financial inclusion is an effort to encourage the financial system to be accessible to all levels of society, thereby promoting quality economic growth while addressing poverty. Further, financial inclusion aims to eliminate all forms of barriers to public access in the use of financial services supported by existing infrastructure (Citradika, 2018).

The various forms of regulation of economic empowerment through existing microfinance have shown the government's preference for the poor society. Unfortunately, the microfinance mechanisms developed tend to be centralized and instructive, resulting in the poor society's dependence on access to government capital. To overcome the weakness of the centralized policy, the East Sumba Regency has issued a community economic empowerment policy known as Integrated Operation Cooperation Economic Empowerment of Villagers. This policy aims to bring microfinance services closer to communities with less access to existing formal financial institutions through the development of microfinance in religious institutions (Abbas, 2010). In addition, since 2012, Bappeda (Development Planning Agency at Sub-National Level) of the East Sumba Regency has also run a SMART program targeting villagers living below the poverty line (income < Rp 600.000 per month) in the form of revolving funds used as venture capital. However, in an evaluation conducted in 2017, it was known that more than 50% of the funds disbursed were stalled (Badan Perencanaan Pembangunan Daerah, 2017).

In addition to the government's top-down approach, the bottom-up approach is expected to improve the effectiveness of poverty alleviation through microfinance. The bottom-up approach is established based on local wisdom that grows in the society, so it is expected to be positive energy that serves as the driving force for the success of the program. This has been proven by the Bondo Tera villagers in West Sumba in running the regular home social gathering system that can not be separated from the values that grow, develop and root in the socio-cultural life of this village community such as the mutual belief among fellow members in groups, the existence of shared values and norms, and the existence of a mutually beneficial relationship (Sulung, 2009). The result of Huruta's (2015) study indicated that there was local wisdom in the household and village level in microfinance, and it was revealed that microfinance is an alternative to open the access of the poor rural society to financial services of formal financial institutions or banks.

Based on Huruta's research (2015), it could be indicated that the development of microfinance is based on a communal rural development framework and is a form of local wisdom consisting of valuable social relationships between individuals and networks of relationships that are useful resources in the determination and reproduction of social positions.

Based on the results of previous research, it is necessary to identify the forms of microfinance that develop in rural areas, both centralized and decentralized based on local wisdom. Sumba has a *marapu* belief that become the basic value in the society framework to think, speak and act (*hamangu*) that someday he or she will become a superior person (*ndiawa*). *Marapu* is the basis local wisdom in the Sumba society in running economic life to be in harmony with the natural and social environment. This *marapu* belief is based on the principle of sustainable development considering economic, ecological and social aspects. This study aims to describe the forms of local wisdom in rural microfinance to address the access problem to financial services in East Sumba.

This research, as it is expected, will contribute in the form of identification of local wisdom forms in microfinance, and the obtained results later can be used as the guidance of the bottom-up approach in developing microfinance forms further. Besides, we assume that the implementation of the identified micro-finance forms can play an important role in improving the welfare of villagers by increasing the accessibility of the villagers to microfinance institutions (Beisland et al., 2015).

2. Literature Review

2.1 Microfinance for poverty alleviation

Robinson (2002) stated that microfinance is a small-scale financial service, especially credit and savings provided to those engaged in agriculture, fisheries or livestock in rural and urban areas in developing countries. There are three things underlined in microfinance: the relatively small amount of operational funds, the mental and social attachment within organizations and targets, and the members who have limitations in access and ownership of funds.

The presence of microfinance is outcome of the psychological condition experienced by humankind about the economic and financial conditions of the poor society (Hulme, 2000; Kabeer, 2005). The poverty condition is identical with the limitations, opportunities and or chances of the poor society to economic, production, finance and marketing access. The concept of microfinance focuses on inferiority, referring to the inferiority of the poor society who have difficult or limited access to financial services or banking. Therefore, the existence of microfinance becomes an alternative that opens space from the limitations and lack of ability to reach economic, production, finance and marketing access.

The concept indicates that in the context of the poor society, microfinance becomes an alternative opportunity for them to manage all forms of business to obtain business capital. In other words, microfinance becomes an innovation associated with microfinance, techniques, and institutions for the poor and low-income society (Hulme, 2000; Kabeer, 2005).

As an alternative to poverty alleviation and mobilizing the society's economics, the microfinance development needs to adhere to the principles of diversity, legal recognition, protection and development (Gerakan Bersama Pengembangan Keuangan Mikro, 2002). Thus, the development of microfinance based on local wisdom becomes an alternative to provide microfinance services for villagers. This is based on the existing conditions which indicate that the majority of villagers is those who are so-called the poor society (Hulme, 2000; Kabeer, 2005).

A debate about the exclusion of the poorest class in the microfinance services leads to two different views. At first, majority of people assume that the poorest do not need microfinance services, but direct assistance. The second, there was an assumption that the poor society was indeed eligible for microfinance services. Therefore, the design of the services should be tailored to their needs (Robinson, 2002). Thus, the reason for the impropriety of microfinance services for the poorest society raised by the first view was disputed by this second view (Usman et al., 2004). The focus of this view emphasizes on a shift in the microfinance paradigm from the promotion or supporting aspects of economic enterprises toward microfinance services that are protected through savings programs, emergency loans, or microinsurance.

2.2 Relationship of Microfinance, Local Wisdom, and Sustainable Development

Microfinance is an important contributor to strengthen and expand the formal financial system and to influence sustainable development (Ledgerwood, 1999; Stevens & Morris, 2001). The existence of microfinance became a basis for potential local management, which emerged from beliefs, norms or rules and networks built to facilitate coordination and strengthen the coalition within the group (Feigenberg et al., 2013). The existence of microfinance as a means of socializing for individuals in the society life (Beisland et al., 2015) could not be separated from its compatibility to Indonesian culture, especially communal culture so that the microfinance was believed to be a means to strengthen social relationships among individuals in the society. In its development, microfinance was not only used as a mean to access capital, but also it was used as a means of hospitality between members with one another. Thus, microfinance has become a mediator for economic and the social environment

relationship. Microfinance developed by considering the local wisdom can create justice to move forward in the social environment. The emerging sense of justice could help to alleviate poverty (Hulme, 2000; Kabeer, 2005).

Local wisdom underlying the development of microfinance also maintains natural harmony. Microfinance can facilitate people in obtaining capital. Capital becomes a means of procurement of production activities carried out. The natural environment becomes the main source of production activities, so the sustainability of the natural environment needs to be maintained to continue to run with local wisdom and social environment. The harmonization of economic, social, and environmental aspects will create sustainable conditions (van Marrewijk, 2003; Starik & Kanashiro, 2013; Scholtens, 2008; Busch et al., 2016).

Resource management is indeed a matter of choice. In the choice, it is presupposed that there is freedom, so the real issue of development is an ethical question. Associated with ethical issues, then Yuwono (2013) called optimization to be a keyword for individuals in every human behavior. Optimization requires choosing exactly one of the choices based on reasonable rules, leaving no ethics. By promoting ethics, microfinance can be the main stream in poverty alleviation on the island of Sumba.

3. Research Methods

This research was qualitative research with a case study of a women group conducting microfinance located in Mbatakapidu District, East Sumba Regency. The data collection of this research was through conducting Focus Group Discussion with *Tapa Walla Badi* Women Farmer Group. Triangulation served a method for processing results of an in-depth interview with *wunang* (traditional spokesperson) and government officials from the relevant offices (Regional Planning and Development Agency of East Sumba Regency).

4. Findings and Discussions

4.1 Identification of local wisdom

The entire Sumbanese native believed in a divine figure called *marapu*. The belief in *marapu* was the belief of the spirits of the ancestors. These spirits, as it was believed, were disastrous if not had cared for. The ancestors divided themselves into two groups namely the great-ancestor (*marapu ratu*) and the ordinary ancestor (*marapu*). *Marapu ratu* consisted of two groups: the great-ancestors who directly came from the sky, and who came to Sumba by boat. *Marapu ratu* was the ancestor who bequeaths some of *Marapu(s)*. The ordinary ancestors consisted of great ancestors (*marapu bokulu*) and small ancestors (*marapu pakahopi*). In general, every *marapu* has ties with the clan (*kabihu*). Each clan had *marapu* himself. Each *marapu* had his own history related to the clan's history closely. Therefore, ordinary ancestors might preferre *marapu* clan (*marapu kabihu*). *Marapu kabihu* was the leader, founder, and hero of the clan and surrounded by myths depicting that he had supernatural powers. Every *marapu* had unequal power, abilities and supernatural powers (Wellem, 2004).

Marapu as a mediator of the intimacy of the relationship between man and the creator performed a ritual. Dhavamony (1995) further mentioned rituals as a more logical expression rather than to be only logical. Rituals showed the order of symbols, which were objectified. These symbols expressed behavior and feelings, and form the personal disposition of devotees following their own models. This objectivity was important for the continuity and togetherness in the religious groups.

The *marapu* beliefs in East Sumba society still provides basis for conducting various activities in the society's life. The *marapu* beliefs as a recognized belief by the government become such a pride and strengthen the society to maintain the survival and balance of nature in Sumba. Some local wisdom that came from the *marapu* belief and became a culture of Sumba were:

4.1.1 Panjulurungu and Pawandangu

Panjulurungu (cooperation) and *Pawandangu* (taking turns) were communal values embraced by the Sumba society since the ancient times. Local values that already existed were *panjulurungu* and *pawandangu* in *belis* regular social gathering (dowry had to be brought by a groom to the bride's family).

Belis regular social gathering had no strict and clear rules. Community members understood and accepted non-formal norms. Everybody knew what donations were expected. The sanctions imposed on group members stem from the rules of the group that was not strict and assertive, but the goodwill of each member to contribute. For members who had not been able to contribute for various reasons, then the group should not be forced, as long as they remained active in group activities. If a member deliberately left the group, did not contribute, and was not active, he needed to reimburse all donations received from other members. In addition, there were also social sanctions, where negligence to pay *belis* by giving donations, then others would not help if they need help. Therefore, each member receiving a donation should record the persons who contribute to him, as well as his or her contribution.

Today, these local communal values are increasingly relevant for Sumbanese people to maintain cultivation of spirit of self-reliance and togetherness in a development process. Thus, social capital was created via the regular home social gathering in Bondotera village, West Sumba Regency that successfully had fostered the spirit of independence and accelerated development. Through the regular home social gathering, the spirit of *panjulurungu* and *pawandangu* was proven to have become a social capital in the Sumba region. This was in line with the findings of Sugianto (2011) who called communal cooperation value derived from their spiritual appreciation, which became the cornerstone of Mondo (Manggarai) community in doing development.

4.1.2 Empty Barns Are Not Allowed

Mbatakapidu people was a local community that had a hereditary tradition regarding food security. This was the inheritance of the Mbatakapidu people ancestors in the past, who were still embodied there. Food security in question was through the provision of three types of barns. There were three kinds of food barns that, in fact, is the inheritance of the ancestors such as the barns in the garden, tree, and attic (*hindi*). The barns in this garden included plants such as rice, corn, *luwa*, *iwi*, taro, cassava, ganyong, papaya, breadfruit, pumpkin, and so on. The barns in the tree-covered corn wrapped around a tree, while the barns in *hindi* consists of corn, sorghum, beans and rice prepared as seeds (*winingu*) for the preparation of the next planting season. The meaning of these three barns wanted to show that the household has adequate food sources. Thus, the existence of these three barns was more or less just to meet the primary needs or household consumption and the seeds preparation. The existence of the three granaries also indicated that the group would help each other during the hunger season (a modern term called it a joint venture or a small cooperative or in the customary language called *pa you rukungu parai ruping*).

The existence of these three barns did not only to support the food availability but was the forerunner of the cooperation version of the Sumbanese. This was in line with Bellah's (1992) view, who believed in Chinese Confucianism (efficiency and harmonization in production effort) collaborating with Japanese Buddhism; the importance of selfless relationships for collective interests (Brundtland, 1987) was emphasized.

4.1.3 Mandara: Between Gathering and Bridging Needs

Mandara was local values of Sumbanese heritage. *Mandara* had a meaning to strengthen kinship between one family and the family who lived in distant (still a clan or close family). This means that when a family visits his distant family's home, they will bring some kind of food and goods such as sarong, cloth, *mamuli*, *lulu amahu* and

so on. When they were about to go home, the host would give back the form of food and so on. This was not because of a causal relationship, but because it was a necessity for the host.

The logical consequences of this family gathering further strengthened the bond between them. Although the exchange rate was not balanced, but these were the local values that needed to be preserved. If it was linked to family visits, it could still be tolerated, but if we led to an individualistic system, there would be no kinship value. *Mandara* met the needs of certain parties with the needs of others, but the most visible thing was the ropes of gathering (kinship). Therefore, the *Mandara* implementation became very important for the life of the Sumbanese in bridging the kinship or tightening the bond between traditional local people, while the rest were partially to bridge the need. This was in line with Vel's (2010) view that the social dynamics of kinship-based has been rooted in the way of thinking and cultural behavior that still exists today.

4.1.4 Empty Cages Were Not Allowed

If we noticed, the Sumbanese ancestors had been thinking about the effort for poverty alleviation. This effort was done by using local wisdom. One of the concrete actions was to receive help from the closest relatives. For example, when somebody was helped by having 1 (one) chicken to be nurtured and bred (*manu tungu pani*). It was also similar if the person was given 1 (one) pig to be reared and bred (*we tungu uhu*).

If the assistance had been well developed (increased in number), it could also be returned to the donor. The calculation was to return half of the number of piglets or chicks. The rest (piglets or chicks) that were the result of my labor can be mine completely. If we want to have a pig or chicken, then we are allowed to return piglets or chicks that number more than half. In raising the livestock, there was a sale for household needs, children's school supplies, the need to buy materials to make houses and the need for customary affairs. When a livestock sale is to be made, the 'empty cages were not allowed' principle was indicated by the availability of livestock replacement before they were being sold. Thus, the sustainability of livestock raising could be maintained. The local wisdom of Sumba society showed the importance of sustainability principle in the maintenance of livestock as a source of livelihood of most of Sumba society at that time.

Until the present time, the poor society in Sumba still believes in advice or guidance from the ancestors. For example: if their children wanted to continue their education to the college level, then the livestock such as cows, buffaloes, horses, goats or pigs would continue to be maintained or kept until their children finish their high school, and then sold to enroll their children in college. This example illustrates what savings, a hearing local wisdom at the household level, mean.

4.1.5 Rotu Padang

Rotu padang was the heritage of Sumba society ancestors. *Rotu padang* implied the attempt to preserve the livestock existence by resisting the sense of greed to use livestock as an object in meeting one's economic and social needs. *Rotu padang* was applicable when there was a consensus within the community, so *rotu padang* was very localistic. This means that livestock will be allowed to grow in accordance with the agreed time, so that the livestock population is controlled and increases in terms of quantity. This was the starting point of sustainability (van Marrewijk, 2003; Starik & Kanashiro, 2013; Scholtens, 2008; Busch et al., 2016). In the context of fisheries (lakes near the sea), it was called mihi parotu, where we should not catch fishes carelessly and usually after one or two years, there would be a simultaneous fishing by the local population.

In practice, if a person had several livestock, although there was a funeral matter, then the livestock still was not be used. Currently, the values have begun to shift where horse or cow or buffalo that is still in the mother's womb is already sold, corn that is not ready to be harvested then it is harvested for consumption, the chicken that

has not been large has also been cut or already sold and other livestock do too. It was a form of Sumbanese disobedience. Actually, there were suggestions that should be contemplated that *pa mbotu nya na limma, pa mbotu nya na eti*. This means, that the assets used carelessly. There was an obedience to keep the assets such as livestock, unless they were unproductive or their cattle having new physical disability; in this case, they could be sold or consumed.

4.2 Relating local wisdom with the widely used microfinance terminology

Based on the results of research in the women farmer group *Tapa Walla Badi*, the microfinance regular social gathering was identified as a form of rural microfinance because it was based on the local wisdom embraced by the Sumba people, where local wisdom was closely related to *marapu* customs or beliefs. The *Tapa Walla Badi* women farmer group was established in 1998, at the initiative of Ms. Marlina (wife of Kawanua NGO activist). The goal was to improve the economics of the mothers so that children did not drop out of school, especially girls. She invited Ms. Corlina who had the skills to weave to train the mothers around to weave and earn extra income. The involvement of Ms. Corlina was approved by her husband; and the activities should be done within her environment. The initial capital was as much as Rp 10.000 / person and followed by four mothers. The initial capital of the group was derived from the sales fee for the activities and the *uang duduk*. Currently (April 26, 2018), the group funds reached Rp 120.000.000.

The *Tapa Walla Badi* women farmer group activities included weaving which was held twice a week, crop farming (corn, cassava, chili, petatas, betel nut, areca nut, turmeric, galangal) conducted in the mother groups' yard, savings and loan activities, cattle breeding (goats, chickens, pigs) and regular social gathering savings for children. Meetings for the regular social gathering was held every 7th and 21st of the month. While the board meeting was held every 28th.

The continuity of regular social gathering as a means of individual socialization in the community life (Brundtland, 1987) could not be separated from its compatibility with Sumbanese culture, especially communal culture. The regular social gathering was considered as a means to strengthen social relationships among individuals in the society. Togetherness as a form of communal life became the main characteristic of this regular social gathering activity. The pattern of group life is originating from kinship culture "*kabihu*" made various activities performed from, by and for the group's interests. In the group, there were social sanctions as well as social concern for its members. *Patembi* appeared through the non-imposed conditions that incriminated members in following the regular social gathering. There was no need for guarantees and other conditions as in the formal financial institutions (Feigenberg et al., 2013; Allet & Hudon, 2015).

Savings and lending activities were also based on a barn or cage that should not be empty, *rotu padang* and *patembi* enriching the savings and loan activities and prefinancing. In the financial terminology and context of *Tapa Walla Badi* women farmer group, savings and loan activities was a form of investment activity and business credit of its members. This was indicated by the funds set aside 25% from the sale of group products as funds for the purchase of raw materials business. In practice, local wisdom still dominated the implementation of this activity. The principle of *patembi* was shown by the granting of interest-free loans (one month's term-borrowing loan) (Morduch, 1999; Armendáriz de Aghion & Morduch, 2005) to assist members with an urgent need, principally with regard to funding the children studies. In addition, the decision making in the forum of the meeting prioritized the principle of the *kabunggul patabokul* by still considering the mutual interests. Operational expenses for running the activities (*uang duduk*) and betel nut were also jointly strived through the membership fees (Rp 2.000 / meeting) and 25% of product sales.

The regular social gathering activities for children's education and savings and loans by mutual capital collection through the product sale of the group business results showed the application of local wisdom *rotu padang*

(reservation) and *tungu pani* or *tungu uhu* (profit sharing). Indeed, *rotu padang* is a reservation effort pasture of a clan. It contains an understanding of environmental preservation or reservation (Brown et al., 1987; van Marrewijk, 2003; Boons & Lüdeke-Freund, 2013; Gladwin et al., 1995; Starik & Kanashiro, 2013). In financial terminology, *rotu padang* can be understood as the capital provision. The fund was set aside for 25% of the sale as a saving and loan capital, and the child's deposit account showed the application of the reservation principle (*rotu padang*) in the activities of *Tapa Walla Badi* women farmer group.

4.3 Analyzing the existing conditions: lesson learned and future direction

Basically, *marapu* belief maintained harmony between nature, human or social and economic (triple bottom line or sustainable development movement). Social solidarity was the main characteristic of the communal Sumbanese community which was shown through *panjulurungu* and *pawandangu* by keeping the economic aspect, not sacrificing the kinship or social relationship (*patembi*), but using it as the basis for poverty alleviation through microfinance in the form of regular social gathering and saving and loan. The sustainability of group activities occurred because of the application of local wisdom of *rotu padang* in the form of funds set aside from the sale of group products. Awareness of the limits of natural and economic utilization with the limits of the ability to absorb these resources arose because of *marapu* beliefs.

Human awareness to maintain the social environment in relation to the economy with *panjulurungu*, *pawandangu*, *patembi* and *kabunggul patabokul* created rules and policies which were equitable. *Rotu padang* and that the 'barns or cages should not be empty' became a basis in policies and rules to sell livestock and the distribution of business product showed that the relationship between economy and environment could continue to run (Gladwin et al., 1995; Starik & Kanashiro, 2013). The human awareness within their social environment to keep the natural environment based on the rules and policies not allowing selling the parents and keeping the livestock became such a goal to survive (bearable). This condition was a proof of sustainable harmonization with a triple bottom line in microfinance activity in Sumba society done with local wisdom base (*marapu*). This was in line with the findings of van Marrewijk (2003), Boons and Lüdeke-Freund (2013), Starik and Kanashiro (2013), Scholtens (2008), and Busch et al. (2016).

A bottom-up approach based on local wisdom in the development of microfinance run by the *Tapa Walla Badi* women farmer group proven to be effective because it was able to survive and became great both in the number of members and managed funds. As microfinance was not only used as a means to access capital but also used as a means of gathering between members with one another, this suggests that microfinance has become a mediator for economic and the social environment relationship.

Based on the successful experience of *Tapa Walla Badi* women farmer group, the model of microfinance development based on local wisdom with bottom-up approach can be applied to other groups as a means of improving access to finance among the poor in the future (Hulme, 2000; Kabeer, 2005; Mosley, 2001), especially those living in rural areas. It was because according to Hulme (2000) and Kabeer (2005), the microfinance developed by considering the local wisdom could create justice to move forward in the social environment and help the attempt for poverty alleviation. This was also in line with Usman et al. (2004) who emphasized the need for a shift in the microfinance paradigm from the promoting aspect or as a support for economic business toward microfinance services that were protected through savings, emergency loans, or microinsurance programs. Figure 1 below depicts the microfinance practice in Sumba:

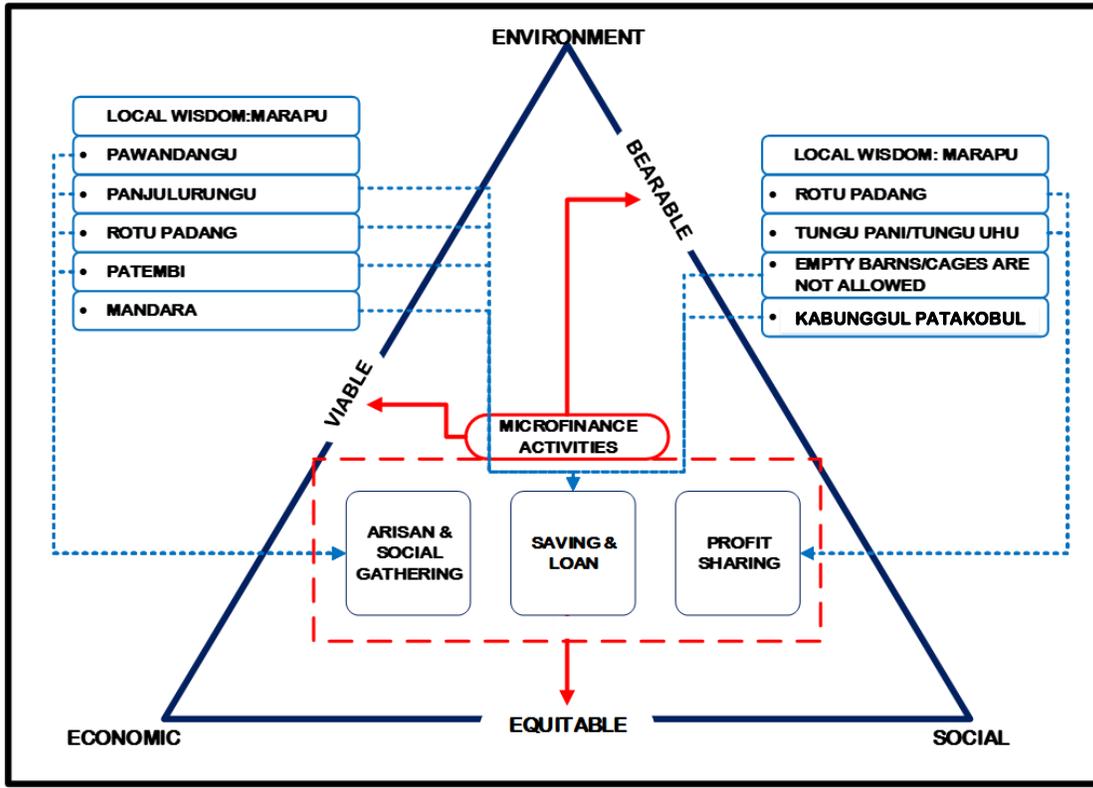


Figure 1. Microfinance Practice based on Local Wisdom in Sumba

Figure 1 shows that the microfinance activities based on local wisdom in Sumba relate to the triple bottom line framework (van Marrewijk, 2003; Boons & Lüdeke-Freund, 2013; Starik & Kanashiro, 2013; Scholtens, 2008; Busch et al., 2016). Local wisdom which is strongly adhered by Sumbanese such as *pawandangu*, *panjulurungu*, *rotu padang*, *patembi*, *mandara*, *tungu pani* or *tungu uhu*, *kabunggul patabokul* and *empty cages* or *barns are not allowed* become the foundation of microfinance activities conducted (artisan & social gathering, saving & loan, and profit sharing). The interaction between economic and environment factors resulted in the viability of microfinance (Gladwin et al., 1995; Starik & Kanashiro, 2013). The economic and social interaction create equitability of microfinance (Morduch, 1999; Armendáriz de Aghion & Morduch, 2005) and the interaction between environment and social factors lead to the achievement of microfinance bearability (Feigenberg et al., 2013; Beisland et al., 2015). Those interactions could be used as a framework of using bottom-up approach in developing microfinance to support rural development. Hence, culture-led development becomes a policy alternative for the local government of Sumba in developing microfinance as a tool to reduce poverty (Hulme, 2000; Kabeer, 2005; Robinson, 2002; Usman et al., 2004; Mosley, 2001).

Conclusions

Marapu customary belief existing in the East Sumba society is still being used as a basis for conducting various activities in the society life. *Marapu* belief as a recognized belief by the government became such pride and was able to strengthen the society to maintain the survival and balance of nature of Sumba.

On villagers of East Sumba, the microfinance forms developed could not be separated from the *Marapu* belief, which is *panjulurungu*, *pawandangu*, *tungu pani* or *tungu uhu*, and *rotu padang*. Regular social gathering, savings, loans, and profit sharing were conducted in management by considering the aspects of equity and sustainability. These microfinance forms became the basis for financing business management, child education, regulation of household cash flows, implementation of customary activities, and natural balance in various forms.

Thus, it appeared that the local wisdom of the Sumbanese community became positive energy and a social capital affecting the success and sustainability of rural microfinance activities as a means of increasing the villagers' access to informal sources of funding. This was in line with Robinson's (2002) opinion that the poor society was eligible for microfinance services so that the design of the services should be tailored to their needs.

The results of this study indicated that the development done with the bottom-up approach by considering the local wisdom became an alternative solution in rural development considering the culture-led development among the *Tapa Walla Badi* women farmer group proved to have succeeded in opening the access of funding for the marginalized community groups that became the target of microfinance service. By promoting ethics, microfinance could become the main stream in poverty alleviation on the island of Sumba. This implies to the local government's choice of bottom-up microfinance development through culture-led development or other approaches.

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THEORETICAL APPROACH TO THE INTERNATIONALIZATION OF SMES: FUTURE RESEARCH PROSPECTS BASED ON BIBLIOMETRIC ANALYSIS

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Abstract. SMEs are considered as the important factor for economic development of countries and thus, internationalization of SMEs plays a significant role in this phenomenon. The internationalization theories are still expanding and being developed by the scholars. While a number of studies explained internationalization, investigations of international behavior of SMEs demonstrates mixed results. The paper aims to overview the theories of internationalization and reveal the interpretations of internationalization concept. The research is based on analysis and synthesis of the scientific literature. In addition, the bibliometric data of accomplished studies in the field of SMEs internationalization were analyzed. The data were collected from Clarivate analytics database. The yearly number of articles in 1990-2019, top authors, journals and locations were considered. Visualization graphics with “VOSviewer” software were developed based on the same bibliometric data. The graphics reflected co-citations of keywords, authors, sources, and referencies among the selected articles. The research contributes to the prevailing studies by revealing the trends and possible research streams.

Keywords: internationalization; SMEs; internationalization theories; bibliometric analysis; VOSviewer; visualization

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JEL Classifications: M13, M16, M19

Additional disciplines: Sociology

1. Introduction

More and more small and medium sized enterprises (SMEs) start to internationalize their activities at the early stages of the firm development. The most recent studies, based on internationalization of SMEs, could be divided into separate research streams: based on born global theory and international entrepreneurship (IE) approach (Schweizer, 2012). Born global and IE approach are the most recent theories, aiming to explain international

behavior of the firms. The theories suggest the assumption that new venture is able to start international expansion since its establishment and thus, focus on the capabilities of the owners/managers, whose skills, experience and personal qualities such as proactivity, previous export experience, and risk tolerance can create huge contribution and value for the firm (Etemad & Motaghi, 2018; Martin & Javalgi, 2018; Bolzani & Foo, 2017). Studies of born global ventures consider networks as the driving forces of internationalization and thus, emphasize the extinction of the internationalization stages. The prevailing opinion that small firms lack resources and experience suggests to focus on global niche markets. Meanwhile, IE literature stresses the significance of decision making, identification of opportunities and interrelate these aspects to internationalization success (Schweizer, 2012).

The overview of the stimulus for international expansion has led to the main categories that include internal or external motives (Bolzani & Foo 2017). Internal motives are related to slack resources or possession of unique product. Meanwhile, external motives could be defined as governmental support, promising orders from customers and prevailing opportunities. Shamsuddoha et al. (2009) noticed that governmental support plays a significant role in the international expansion of SMEs. The studies confirmed that participation in export assistance programmes impacted the firm's performance. Thus, the policymakers at both, national and regional levels seek to promote and support international activities of SMEs. Finally, the policy of the European Union increased the awareness that export contributes to the general performance of SMEs (Manolova et al. 2010).

The internationalization theories are still expanding and being developed by the scholars. While a number of studies explained internationalization, investigations of international behavior of SMEs demonstrates mixed results. The paper aims to overview the theories of internationalization and reveal the interpretations of internationalization concept. The research contributes to the prevailing studies by revealing the trends and possible research streams. The study is based on bibliometric data of accomplished studies in the field of SMEs internationalization. The data were collected from Clarivate analytics database. The yearly number of articles in 1990-2019, top authors, journals and locations were considered and allowed to make significant conclusions. Visualization graphics with "VOSviewer" software were developed based on the same bibliometric data. The graphics reflected co-citations of keywords, authors, sources, and referencies among the selected articles. The paper is structured as follows. First, the discussion on the theories of internationalization is provided. Next section defines methodology of the study. The third section provides obtained results. The final section concludes.

2. The literature review of theories related to the internationalization

Internationalization of SMEs is recognized as the main force for economic growth, competition, and new workplaces creation. Therefore, scholars over the past decades invested a lot of efforts for the better understanding of this topic (Krikštulytė & Korsakiene 2016). The importance of SMEs in the economic growth of emerging countries has been recognized by a number of scholars. Though, internationalization of SMEs from developing economies did not attract enough attention of the scholars, the increasing interest could be observed (Senik et al. 2011). The following paragraphs present the development of internationalization theories and subsequently, the content of internationalization's concept.

Begeny (2018) noticed that internationalization usually is discussed in terms of globalization as being part of it. Thus, internationalization is defined as the response to globalization, which includes sharing of knowledge, people, technologies, values and ideas without the borders. Globalization and internationalization are two different, but closely interrelated concepts. While globalization triggers international processes, internationalization becomes a proactive response to it. Singh et al. (2010) assumed that internationalization is provoked by globalization processes all around the globe and noticed that more and more small firms internationalize at the earlier stages of their development. Internationalization can be associated not only with export but also other ways of performing international trade or collaboration. Meanwhile, Agndal & Chetty (2007) defined internationalization as a progressive process, which requires the revision of the strategy. The

scholars demonstrated double-sided view to the internationalization strategy, which includes orientation to the specific country and particular business model. The development of the researches, focused on internationalization, resulted into main theories: Industrial organization theory (IO), Traditional internalization theory (IN), Transaction costs theory (TCT), Dunning's eclectic paradigm, resource-based view, networking and modern approach.

Industrial organization theory relates market situation with the decision-making process of the company, which seeks to create a strategy for the whole business. This theory was criticized due to forgetting entrepreneurs' contribution to the company's performance and capturing the market at the ideal situation of competition (Uzunidis, 2016). According to this theory, starting a business in the foreign market cost more than establishing it in the local market (Caves, 1971).

Internalization theory claims that the company will develop an international market and continue foreign expansion if the costs are not exceeding the margin. Thus, the foreign expansion creates preconditions for the creation of multinational company. The preparation for this act consists of information collection, which helps to identify the most acceptable way of the new market entrance (Ruzzier et. al 2006). Internalization theory investigates the strategy of international companies when value-added products and services are suggested for the foreign markets. It is based on knowledge, R&D activities and the market's imperfections (Buckley. 1988).

Transaction cost theory related to the strategical planning of the company, consider the cost of producing, buying or allying (Geyskens et al. 2006). This theory started to analyze the nature of the firms, when important choices of markets or hierarchical structures have to be made, taking into account the costs (Coase, 1937). Williamson, O. (1975) highlighted that transaction costs theory is closely related to internalization theory, but it differs only in units of transaction cost analysis.

The resource-based view is focused on various resources and capabilities of the firm. The goal of strategic management is to identify resources, which could be hardly imitated. The ability to obtain competitive advantage leads to the successful process of internationalization (Barney, 1991). Li (2018) defined export behavior according to the resource-based view as expansion driven by resources that create competitive advantage in the international area. The first attempts to explain why companies chose to start their activities internationally were referred to valuable, rare and hardly replacive resources that create the competitive advantage of the firm. Later on, this view was criticized due to the claim that these aspects of the resources are the main components of competitive advantage. More recent explanations mostly refer to the main two resources: human and social capital, positively impacting internationalization.

The eclectic paradigm complements internationalization theory with an explanation of the country choice and production forms. This approach analyses foreign direct investment as the form of internationalization and distinguishes three main advantages that encourage companies to start the international expansion. These advantages are related to the ownership of the company and combine possibility to increase income, the capability to suggest valuable production across the foreign markets and decision of location that best suits company's needs (Dunning, 1988).

The networking theory's approach to internationalization is related to the resource-based view because it focuses on the networks of the entrepreneur in the market. Thus, networking is analyzed as a key factor, influencing the internationalization of SMEs. The available networks help entrepreneurs to initiate their business activity internationally and obtain international integration (Kunday & Pi, 2015; Chandra & Wilkinson 2017).

Table 1. Traditional theories related to internationalization

Theories	Researchers
Industrial organization theory (IO)	Hymer, 1960; Kindleberger, 1969; Caves, 1971; Agmon & Lessard, 1977
Internalization theory (INT)	Caose, 1937; Penrose, 1959; Buckley & Casson, 1976; Rugman, 1981
Technological Gap Theory	Posner, 1961; Hirsch, 1965; Hufbauer, 1966
The Product Life Cycle (PLC)	Posner & Linder, 1961; Vernon 1966
Transaction cost theory (TC)	Williamson, 1971, 1975; Hennart, 1982
Dunning’s eclectic theory	Dunning, 1977, 1979, 1988
Uppsala Model of Internationalization	Johanson & Vahlne, 1977; Johanson & Weidersheim-Paul, 1975
Resource based view (RBV)	Wernefelt, 1984; Barney, 1991
Networking theory	Johanson & Mattssin, 1988

Source: created by the authors

Modern internationalization approach was developed after the years of discussions on the internationalization process of small firms. This approach was associated with the growth in the local market and the expansion internationally in the later stages of the development. Later on, the studies confirmed that these theories include misconceptions because a number of new ventures had international orientation nearly since the beginning. New empirical findings contributed to the development of a new theory called “Born global” that highlights the willingness of small firms to generate international income as early as possible (Etemad & Motaghi 2018). A number of studies, based on born global firms and catalyzing factors of international expansion, resulted in IE theory which has become an attractive research field in recent years. IE theory is focused on the firms ‘international activities and strategies, therefore have recognized their impact. The concept of internationalization, associated with IE, refers to the managers/entrepreneurs’ behaviors, including risk tolerance, innovativeness, and proactiveness, which leads the firm towards successful international expansion (Martin & Javalgi 2018). Bolzani & Foo (2017) pointed that IE theory started to focus on the entrepreneur’s abilities in decisions making and setting high goals. These qualities accelerate international expansion and boost the whole performance of the company.

Table 2. Modern theories related to internationalization

Theories	Researchers
“Born global” approach	Rennie, 1993; Oviatt & McDougall, 1994; Knight & Cavusgil, 1996
“International entrepreneurship” (IE) approach	Coombs et al. 2009; Keupp & Gassman, 2009; McDougall & Oviatt, 2000

Source: created by the authors

3. Methodology

First of all, keywords that fully covers the topic of SMEs’ Internationalization, were identified as follows: “internationalization”, “international expansion”, “export”, “SME*”, “small firm*” or “small business”. These keywords were used in Clarivate Analytics search engine as the syntax stream: TS=(internationalization OR international expansion OR export) AND TS=(SME* OR small firm* OR small business). The search resulted in 2439 articles from 1990 to 2019, which were written in the English language. The results were refined only to

articles that belong to business, economics and management categories. After this step, 1788 articles were used in the further process of analysis.

The results are based on discussion of bibliometric data, visualization with histograms and tables, bibliometric maps, which were created by „VOSviewer“ software. This tool is being used for creating maps from bibliometric data and visualizing it. The common objects among all maps created with „VOSviewer“ are links and clusters. The links determine the relation between two items, while clusters are the set of items, indicated by the same color in the map (Van Eck & Waltman, 2018).

We have analyzed a number of articles from 1990 to 2019, the most productive authors, countries/regions and most popular journals of the field. Also, bibliometric maps of co-occurrence of all and authors' keywords (keywords indicated by the authors before the introduction of the article), co-citation of cited references and sources, authors (two reference, sources or authors citation in the same document), the bibliographic coupling of countries were examined.

4. Results of bibliometric analysis

Figure 1 reveals the number of articles in 1990-2019. The tendency of increasing interest of the scholars in the internationalization of SMEs can be indicated from the graphics. In addition, the predictions that this tendency remains to be sustainable in the future, can be made.

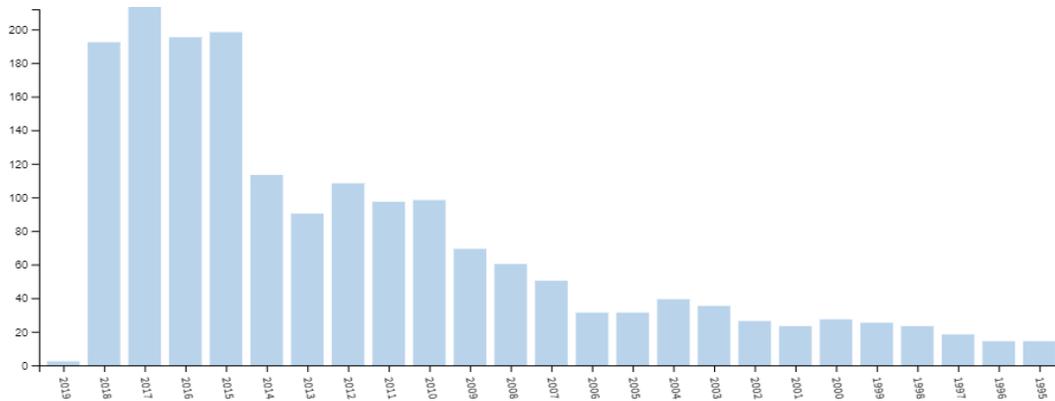


Fig. 1. Number of articles in 1990-2019

Source: Clarivate Analytics

Table 3 presents the most productive authors according to the number of articles in the internationalization field. The most productive author is Crick D., who has published 13 articles in the field of SMEs internationalization. Meanwhile, other scholars who published less articles than Crick, D. were Dmistratos P., Chetty S., Wagner J., and Hilmersson, M.

Table 3. Top 5 authors according to the number of articles

Author	Record Count	% of 1,788
Crick D.	13	0,73
Dimitratos P.	12	0,67
Chetty S.	11	0,62
Wagner J.	11	0,62
Hilmersson M.	9	0,50

Source: Clarivate Analytics, calculated by the authors

The most frequent journals in the analyzed field are International Business Review (91 articles published) and Small Business Economics (72 articles). The other popular journals are International Marketing Review (57), Journal of Small Business Management (48), Journal of International Economics (46), Journal of World Business (43), Journal of Business Research (41), International Small Business Journal (35), Journal of International Marketing (31) and Journal of International Business Studies (28).

Table 4. Top 10 sources according to the number of published articles

Source titles	Record Count	% of 1,788
International Business Review	91	5,09
Small Business Economics	72	4,03
International Marketing Review	57	3,19
Journal of Small Business Management	48	2,69
Journal of International Economics	46	2,57
Journal of World Business	43	2,41
Journal of Business Research	41	2,29
International Small Business Journal	35	1,96
Journal of International Marketing	31	1,73
Journal of International Business Studies	28	1,57

Source: Clarivate Analytics, calculated by the authors

Table 5 indicates the top 10 countries according to the number of resulted articles. The most productive researchers are from the USA, who published more than 20% of all articles in the internationalization of SMEs. Also, similar numbers of articles were published by the scholars from the UK (255) and Spain (147). Meanwhile, less articles were published by the scholars from Italy (122), China (117), Australia (102), Canada (102), Germany (101), Sweden (101) and France (67).

Table 5. Top 10 countries/regions according to the number of resulted articles

Country/Region	Record Count	% of 1,788
USA	370	20,69
UK	255	14,26
Spain	147	8,22
Italy	122	6,82
China	117	6,54
Australia	102	5,71
Canada	102	5,71
Germany	101	5,65
Sweden	101	5,65
France	67	3,75

Source: Clarivate Analytics, calculated by the authors

The bibliometric data of the selected articles were used in the further graphical analysis. Fig. 2 illustrates the distribution of the most frequent keywords. For this purpose „VOSviewer“ software was used. The bubble size in the figure demonstrates the importance and weight of the keyword, while the weight of line – how strong the link is. The network consists of clusters, which are indicated by different colors. In total 582 keywords, which belong to 8 clusters and have 25438 links were identified. The most significant clusters are: “performance”, “diversification”, “ownership” (violet cluster), “international trade”, “growth”, “globalization” (red cluster), “knowledge”, “networks”, “capabilities”, “market entry” (blue cluster), “competitive advantage”, “resource-based view”, “small and medium-sized enterprises” (green cluster).

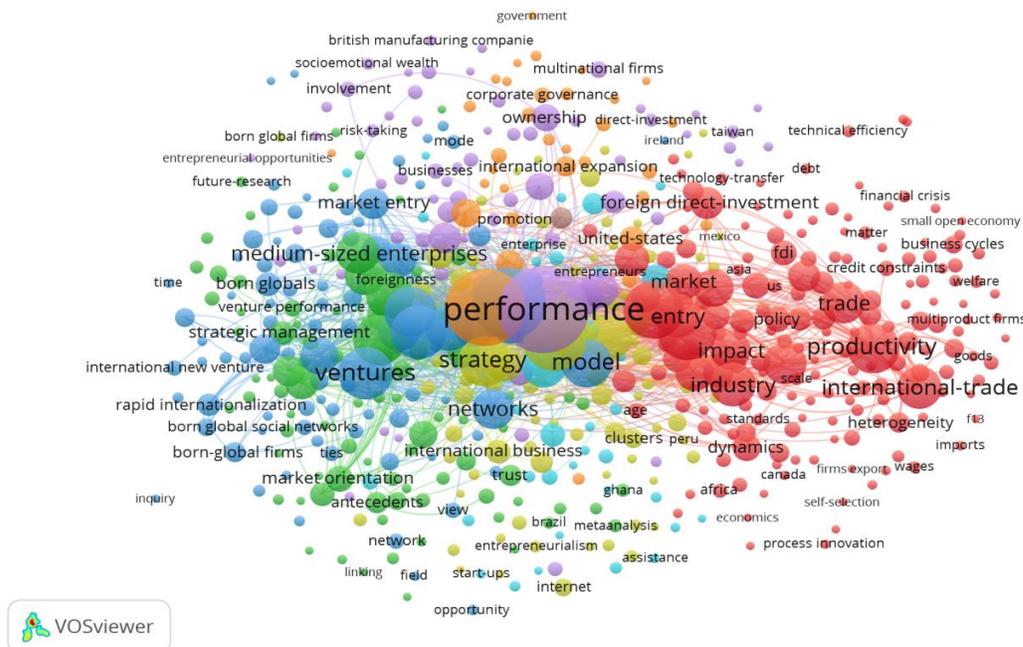


Fig. 2. Co-occurrence of all keywords

Source: created by authors with “VOSviewer” software

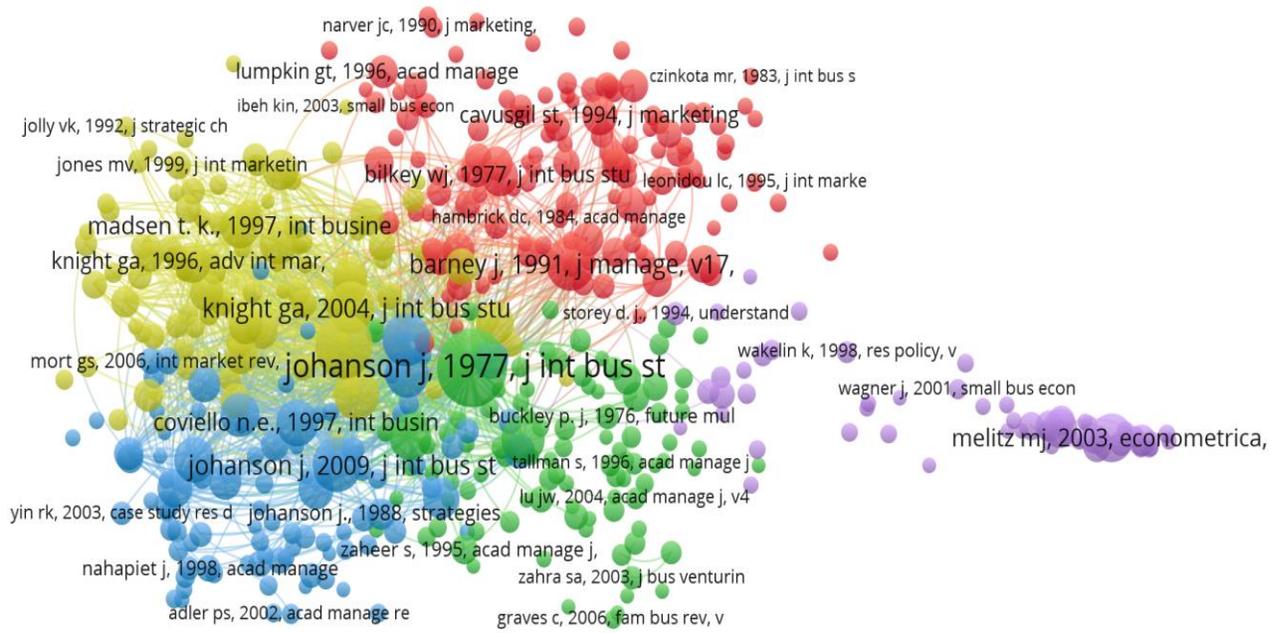


Fig. 4. Co-citation of cited references

Source: created by authors with “VOSviewer” software

Figure 5 presents co-cited sources. There were identified 430 sources, among which the most co-cited were Journal of International Business Study – 6549 citations and 428 Links. The second most co-cited journal was Strategic Management Journal – 2972 citations and 425 links. Other frequently cited sources were: International Market Review – 2112 citations and 417 links, Academic Management Journal – 2040 citations and 422 links and Academic Management Review – 1477 citations and 421 links. All network consists of 5 clusters and 55595 links.

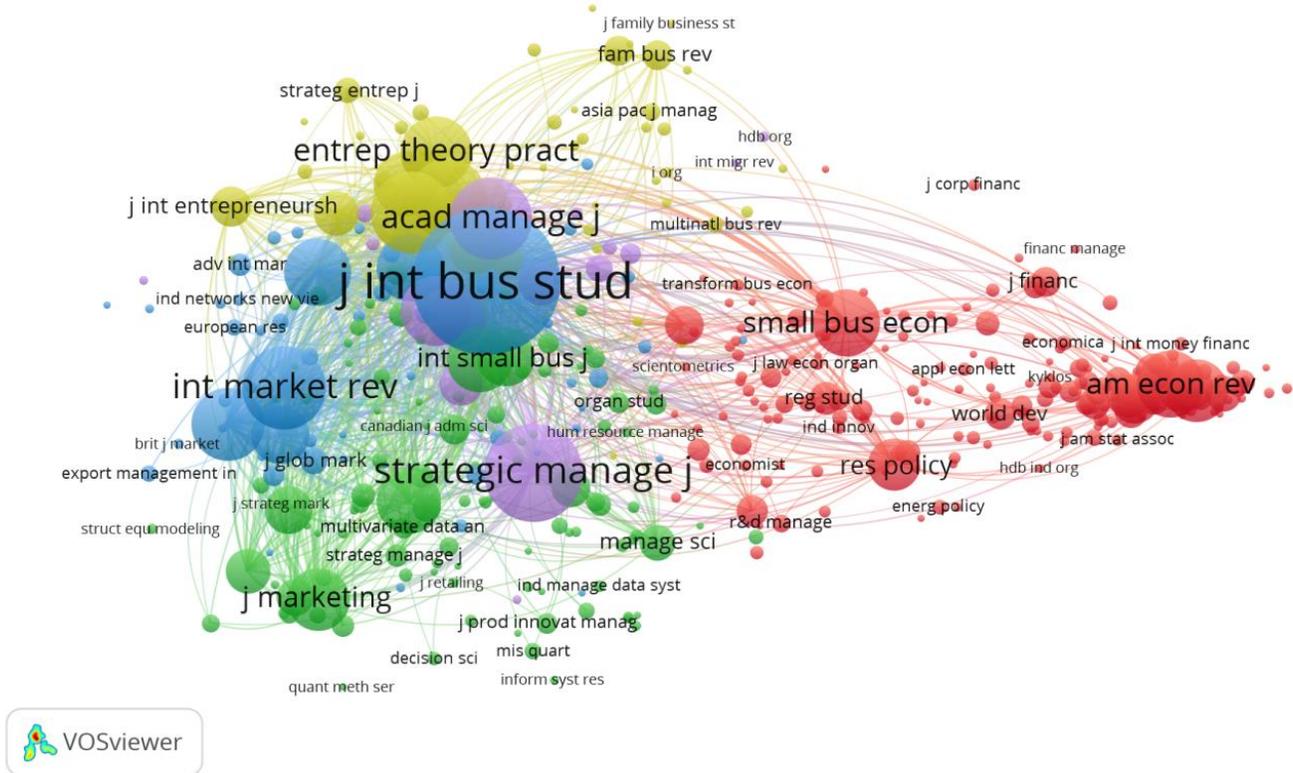


Fig. 5. Co-citation of cited sources

Source: created by authors with “VOSviewer” software

From 29236 authors in total, only 721 authors were co-cited 20 times and more. The network of co-cited authors consists of 5 clusters and 152509 links. The most co-cited authors are Johanson J. – blue cluster, 1239 citations and 740 links, Cavusgil St. (green cluster, 559 citations, and 704 links), Oviatt bm. (yellow cluster, 650 citations and 729 links) and Bernard Ab. (red cluster, 497 citations and 543 links).

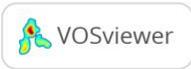
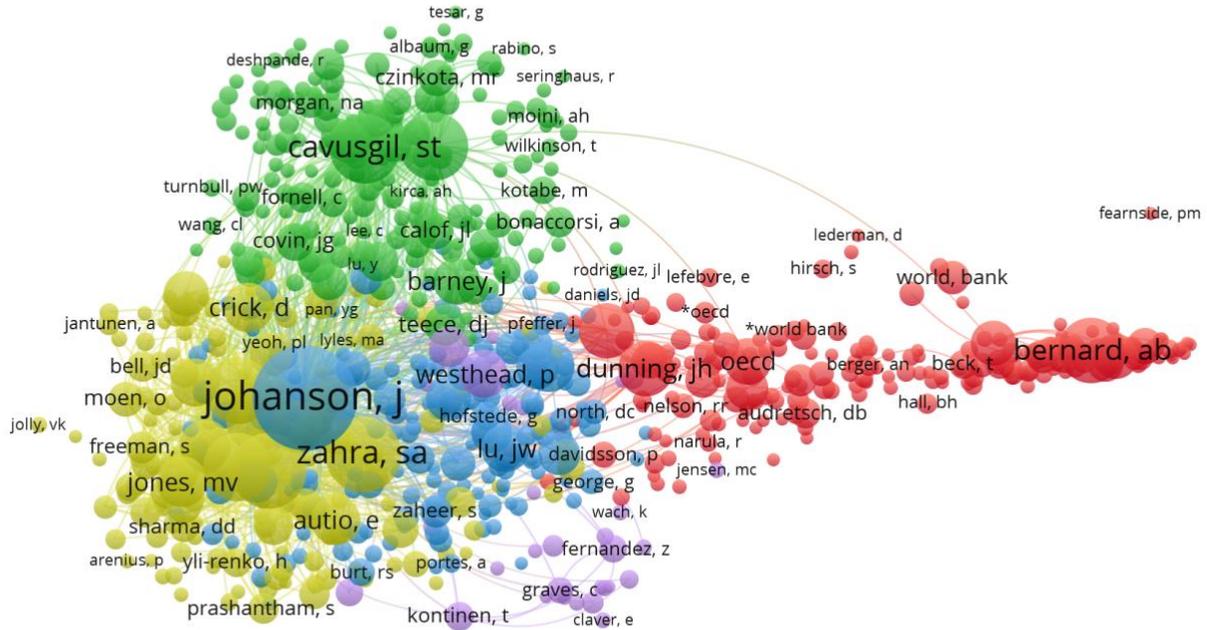


Fig. 6. Co-citation of authors

Source: created by authors with “VOSviewer” software

The other interesting point of view is a bibliographic coupling of the countries. Figure 7 presents a network of 64 countries out of 91. The scholars of these countries prepared more than 5 articles. The network of the countries consists of 6 clusters and 1978 links. The most productive country is USA (red cluster, 356 articles, 63 links). The second group of countries according to the productivity are England (green cluster, 249 articles, 63 links) and Spain, which also belong to the green cluster (146articles, 63links). From violet cluster, the most productive country is Italy (118 articles, 63 links). The most productive country from the yellow cluster is China (117 articles). Dark Blue cluster includes Australia (101 articles) and Sweeden (99 articles). From the light blue cluster, we can distinguish Canada (98 articles).

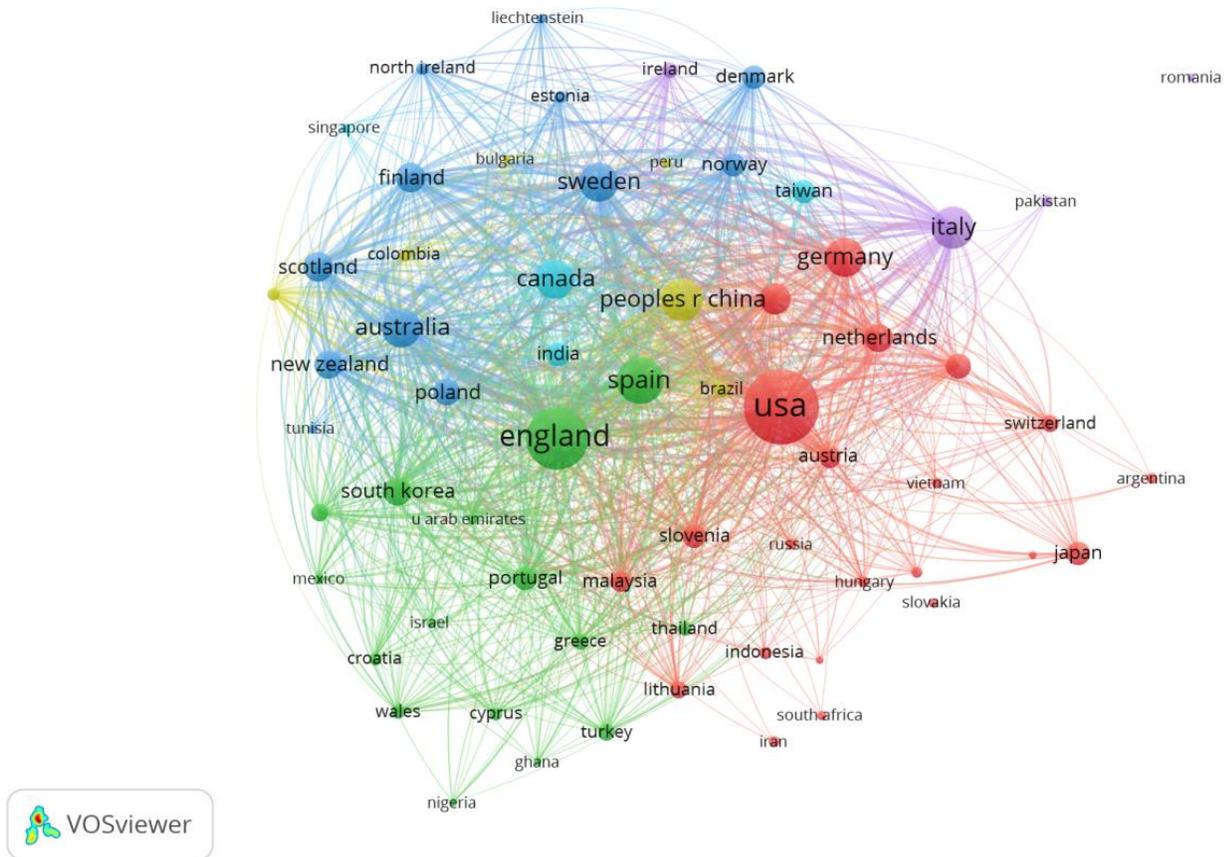


Fig. 7. Bibliographic coupling of countries

Source: created by authors with “VOSviewer” software

In conclusion, bibliometric maps are the useful tool in bibliometric analysis. Presented co-occurrence and co-citation maps assisted in bibliometric data analysis and highlighted the important aspects of previously performed studies. Co-cited keywords were mainly oriented to internationalization and export process or performance. This implication can suggest that other aspects of the internationalization of SMEs are less investigated. Co-citation of cited references, sources and authors helped to identify the most significant literature, which could be used as the background for further studies. Bibliographic coupling of countries revealed, which countries are less active in the research process and subsequently, develop less studies.

Conclusions

The number of research papers, investigating the internationalization of SMEs, has been increasing in the past four years as compared to the previous periods. The analysis indicated that the number of research papers in this field was close or up to 200 per year since 2015, while it was close or up to 100 publications per year five years ago. The increase in the publications' number by almost 50% in the recent four years demonstrates the relevance of the topic and necessity for deeper investigations in the area. These tendencies are in line with political priorities of separate countries, focused on the support of SMEs. Apparently, the interest of decision-makers in international activities lie in the positive effect of export performance on countries' economy growth.

The further analysis of the articles in the field of internationalization of SMEs let us identify the most productive authors, the most popular journals and the regions/countries. The most productive authors in investigated field of study are Crick D., Dimitratos P., Chetty S., Wagner J. and Hilmersson M. The most popular journals: International Business Review, Small Business Economics, International Marketing Review, Journal of Small Business Management, Journal of International Economics, Journal of World Business, Journal of Business Research, International Small Business Journal, Journal of International Marketing and Journal of International Business Studies. This information let us identify the reliable sources in the field and is helpful for further researches.

The most influential scholars in the research field were from the following countries and regions: USA, England, Spain, Italy, China, Australia, Canada, Germany, Sweden, and France. The information about accomplished researches in the field of SMEs' internationalization shows the actuality of the topic in many countries. Nevertheless, a number of developing countries such as, South Africa, Iran, Nigeria, Ghana and etc. lack studies in this field.

Co-occurrence of all keywords' analysis identified 8 clusters and have 25438 links. The most significant clusters are sated as follows: in one of the clusters "performance" and "diversification are dominating topics, in other - "international trade" and "globalization". In the third cluster dominating topics are "networks", "capabilities", "market entry", while in fourth cluster - "competitive advantage", "resource-based view" and "small and medium-size enterprises". Co-occurrence of keywords' analysis reveals similar clusters such as: "internationalization"; "SMEs"; "export" and "trade"; "International entrepreneurship" and "international new ventures"; "international business" and "international marketing". These keywords show that internationalization and SMEs are related topics, which requires deeper investigations. Thus, the aspects of internationalization such as, networks, knowledge, competitive advantage and resources have to be considered. These aspects determine the phenomenon of SMEs internationalization and have to be considered in the further researches.

The analysis of the co-citation of cited references indicated that there are 5 main clusters, where the biggest one is red, which consists of 126 co-cited references. The most co-cited references are Johanson J. (1977), Oviatt Bm. (1994), Knight G. (2004), Bartney J. (1991) and Johanson J. (2009). Co-citation of authors' examination revealed the most co-cited authors: Johanson J.; Cavusgil St.; Oviatt Bm. and Bernard Ab. Co-citation of both references and authors suggests that Johanson J. and Oviatt Bm are the most influential authors in the analyzed field. Thus, further research should consider their contribution to the research field.

The visualization of co-citation of cited sources indicated 430 sources, among which the most co-cited were Journal of International Business Study, Strategic Management Journal, International Market Review, Academic Management Journal and Academic Management Review. These journals appear to be the main outlets in management and economic.

The analysis of co-citation of cited references, sources and authors helped to determine the most relevant literature for the further investigations in the field. A close look at the bibliographic coupling of countries helped to determinate the most productive and collaborating countries, which are USA, England, Spain, Italy, China, Australia, Sweden, and Canada. This also indicates the necessity for more investigations in Central and Eastern Europe as well as wider collaboration among scholars in the region. Further studies of SMEs' internationalization could implement a cross-sectional approach and develop a more holistic viewpoint.

Limitations of the study are related to the selection of one database for bibliometric data collection, which could be extended in the future studies by considering multiple choices of the databases. Even the articles' results in the Clarivate Analytics database were refined by field and language for reaching a considerable number of articles, which could be suitable for further research. The more accurate analysis should not use any filters for refining, but try to extend the choice of keywords for more defined research field. The analysis using "VOSviewer" could be extended. For example, some mapping options are missing in this study (co-authorship analysis).

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THE PERCEIVED VALUE OF SOCIAL MEDIA MARKETING: AN EMPIRICAL STUDY OF ONLINE WORD OF MOUTH IN SAUDI ARABIAN CONTEXT*

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Abstract. Despite the dramatic increase in the use social media marketing and huge business investments allocated to online marketing, little is known about consumers' perceived value of social media marketing. The perceived value concept is key factor in traditional consumer behavior. However investigations into online channels have not been done intensively. The present work has succeeded in demonstrating the role of perceived value on online consumer behavior and its influences on online word of mouth (OWOM) and behavioral loyalty. Based on a sample of 525 respondents who were social media users, the study used Partial Least Squares (PLS) technique to analyze the data. The study has succeeded in filling various gaps of knowledge and literature. The gaps addressed by the present work includes aspects pertaining to perceived value of social media marketing, online word of mouth, behavioral loyalty on online channels, etc.

Keywords: Consumer behavior; Social media marketing; Online word of mouth; Perceived Value; Customer Loyalty

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1. Introduction

Social media platforms provide immense opportunities for businesses to achieve their marketing objectives at considerably low costs. Recently, social media marketing has received increasing attention among industry and academic circles. Reflecting this reality, De Vriesa, Genslera and LeeFlanga (2012) opines that more than half of social media users are following their favorite brands on twitter. Moreover the worldwide spending on social media marketing is estimated to be USD 35.98 billion in 2018 (Kusumasondjaja, 2018). This shows that social media marketing has opened up a whole new vista of opportunities.

With dramatic increase in the use of social media channels, followed by huge investments in social media marketing, there definitely is a need for revisiting marketing relationships. The geographic disparate of online communities allows sharing of experiences among different cultural and ethnic groups. This distinct feature is expected to yield new inspirations and dimensions in the decision making process. As a direct consequence of this, there is likely to be marked change in perceptions, expectations and satisfaction level of consumers; especially when they are exposed to varying and better business practices and experiences.

Contradictory findings have been reported by social media marketing researchers (Duan, Gu&Whinston, 2008). These findings have raised questions as to whether the current changes in contexts have affected the results of empirical examinations. A classical example is the assumption that the same causal relationships in traditional marketing are also applicable to online consumer behaviors. This aspect, highlighted by Duan, et al, (2008) in their seminal work calls for further investigation of the influence of online word of mouth (OWOM) in consumers' buying decisions.

2. Review of Literature

Word-of-mouth (WOM) has been identified as a strong information transmission tool since time immemorial (Ellison and Fudenberg, 1995; Godes and Mayzlin 2004; Maxham and Netemeyer 2002), which has successfully been used by businesses to influence consumers. The uniqueness of WOM over traditional marketing has been highlighted by Duana, Gu and Whinston (2008), when they stated that "WOM leads to more product sales, which in turn generate more WOM and the more product sales". However, the conventional WOM has certain inherent limitations, as it is effective only across limited social contact boundaries. Further, its influence diminishes rapidly across time and distance (Bhatnagar and Ghose, 2004).

With the advancement of information technology (IT), emerged a host of online social networking sites and platforms. The online networking sites have drastically changed and disrupted the way marketing is now done. These sites have succeeded in transcending many of the limitations of traditional WOM (Laroche, Yang, McDougall and Bergeron, 2005) and have given a new dimension to social media marketing. The potential of social media marketing has made business to accord top priority. With the turn of the century online WOM was identified as a tool that could be highly successful in being leveraged as a successful marketing tool (Dellarocas, 2003).

The review of literature for the study considers and involves four main knowledge areas which represent the main constructs of the study. These areas identified are social media marketing (De Vriesa et al., 2012), perceived value (Halbrook, 1994; Sánchez-Fernández & Iniesta-Bonillo, 2007), loyalty (Kotler & Armstrong, 2008; Mandhachitara, et al., 2011; Rundle-Thiele, 2005), and word of mouth (Duan, et al, 2008; Verhagen, Nauta & Feldberg, 2013). The following section presents a fair view of these four identified areas.

Social Media Marketing

Though of recent origin, sufficient literature has accumulated about the various aspects and dimensions of social media marketing. Social media marketing is the "online applications, platforms and media which aim to facilitate interactions, collaborations and the sharing of content" (Kim and Ko, 2012 p.1480). The applications or platforms could include Twitter, Facebook, Instagram, Snapchat, etc. The contents of these applications appear in number of forms like texts, videos, photos, etc. A study by Kim and Ko (2010) found a significant influence of social media marketing on brand reputations. A high influence of social media marketing information in consumers' purchase decisions, as compared to the traditional social influence was also found by Kim and Ko (2012). Consumers' emotional attachment through social media platforms was examined by Dholakia and Durham (2010).

With the emergence and manifold growth of web 2.0 implications in marketing, a number investigation have attempted to study brand popularity by considering the number of likes or favorites given to a specific post (De Vriesa et al., 2012). However, this technique has a number of limitations. For instance, though the number of likes can be used as an indication of consumers' attitudes towards products and services, it only measures their affective component of attitudes. This does not discuss the behavioral component exhibited in the social media platforms. It has been identified that post sharings or retweets provide meaningful feeds about consumers' behavioral attitudes like behavioral loyalty and online word of mouth (OWOM). This marketing tool is now playing increasingly significant role in the current day consumer purchase decisions (Duan, et al, 2008).

It would now be imperative to have a fair discussion about OWOM.

Online WOM (OWOM)

OWOM is a new marketing tool in the hands of the retailers that has emerged in the digital age, which can be successfully leveraged to reach the desired consumer groups, as well as to strategically influence consumer opinions (Chen and Xie 2004; Dellarocas, 2003; Senecal and Nantel 2004). OWOM is defined as informal communications among online communities about certain products, services, or brands through which they share their experiences and perceptions (Cheung and Lee, 2012; Eastet, al., 2007). Literature about OWOM suggests that it is a tool that shifts the control of communication message from the firm to its consumers. In the initial stages it was generally perceived as threat to marketing efforts, as there could be negative messages (Verhagen et al, 2013). But with the passage of time and the potential of OWOM becoming evident, the attitude towards OWOM underwent a sea change, and it now holds prime position in almost all promotional and marketing activities.

OWOM has also been referred to by many researchers and marketers as e-WOM (Andreassen and Streukens 2009; Cheung et al. 2009, Dhar and Chang 2009; Trusov, Bucklin, and Pauwels 2009). A few other have used the both interchangeably (King, Racherla and Bush, 2014). A fair review of the available literature presents the fact that, but for the nomenclature, there exists scant difference between the two. Further, OWOM seems to be used by majority of researchers. Hence in the present work, the researchers chose to use OWOM.

OWOM enables consumers to interact socially, to exchange experience through computer-mediated conversations (Blazevic et al. 2013; King, et al, 2014). Various types of OWOM communications have been identified in literature. This is spread over a host of platforms and types. Some of the types of OWOM communication include blogs (Dhar and Chang 2009; Kozinets, De Valck, Wojnicki. and Wilner, 2010); discussion forums (Andreassen and Streukens 2009); product reviews (Tirunillai and Tellis 2012); social networking sites (Trusov, Bucklin, and Pauwels 2009); UseNet groups (Godes and Mayzlin 2004; Godes and Silva, 2012); etc. King, et al,

(2014) identified six characteristic of WOM – Enhanced Volume, Dispersion, Persistence and Observability, Anonymity and Deception, Salience of valence and Community Engagement.

Substantial empirical results exist to prove a positive relationship between OWOM and product sales (Chevalier and Mayzlin, 2006; Li and Hitt, 2008; Liu, 2006). It was also observed that managing positive WOM would help reducing promotional expenditures and creating a form of community support for their respective brands (Reichheld and Sasser, 1990). Positive WOM was found to have a significant influence on decision making process (Verhagen, Nauta and Feldberg, 2013). Söderlund (1998; p.172), defines positive WOM as:

"the extent to which a customer informs friends, relatives and colleagues about an event that has created a certain level of satisfaction".

Empirical evidence exists to prove that products having multiple positive reviews often tend to attract still more such reviews (Moe and Schweidel, 2012). A number of researchers have classified WOM as a behavioral indicator which arises as a direct consequence of an emotional attitude and an incidence of repeat purchase by friends and families (Verhagen, Nauta and Feldberg, 2013).

Research about WOM and customer satisfaction is inconclusive, as it has thrown up contradictory results. For example, Fisk, Brown, Cannizzaro, and Naftal, (1990) reported a negative relationships between customers satisfaction and WOM due to asymmetrical factor between negative and positive satisfactions i.e. negative satisfactions generate stronger reactions compare to positive satisfactions (Söderlund, 1998). Similarly, Taylor (1991) indicated that negative satisfaction creates emotional signals for certain reactions whereas positive satisfactions usually do not. On the other hand, Holmes and Lett (1977) reported a stronger influence of positive satisfaction on WOM compared to negative satisfactions. This is due to "Pollyanna Principle" which posits that people are more likely to remember and response to pleasant memories compare to unpleasant experiences (Clow, & Seshadri, 2015 and Venkataramani, Labianca, & Grosser, 2013).

A word of caution has also been sounded by researchers regarding OWOM. For instance Cui, Lui, and Guo (2012) and Mizerski (1982) identified a form of negativity bias. They found that in case consumers are neutral while reviewing, the available negative reviews are found to gain more salience than the available positive reviews. This could cause distortion and disadvantage to the promotion and marketing activities. These contradictory findings call for more investigations for the on these relationships.

The present study intends to focus on the influence of OWOM on consumers perceived value and its role on influencing behavioral loyalty. Despite substantial growth on the number of empirical works about social media marketing and increase in number of marketing journals associated with interactive marketing, there exists scant knowledge about perceived value of social media and its influence of the behavioral attitudes such as loyalty and OWOM.

Perceived Value

Considerable attention has been provided by academics and professionals to the concept of perceived value (PV) since its emergence in the 1980s (Halbrook, 1994). This concept was classified as priority research area by Marketing Science Institute between the years 2006 and 2008 (Sánchez-Fernández & Iniesta-Bonillo, 2007). According to Wang et al., (2004), its importance stems from the economic and psychological dimensions of the concept; and its ability to generate competitive advantages for businesses. It was reported by number of researches as a key construct to understand consumer behavior (Wang et al, 2004). A number of researchers have empirically observed significant relationships between perceive value and behavioral loyalty. However PV has been subjected to vast definitional debates and had been a concept of misinterpretation that was overused and misused (Sánchez-Fernández et al, 2007).

One of mostly common agreed on definition of PV is that it is “the overall assessment of the utility of a product based on a perception of what is received and what is given” (Zeithaml, 1988, p. 14). This simply means the trade-off between what is gained and what is given (Monroe, 1990). Despite the importance of PV in the investigation of consumer behavior, only scant focus have been provided to the perceived value of social media marketing.

The Utility Theory (Fishburn, 1970) has been predominantly used to build the theoretical foundation of PV as it provides a justified explanation of consumers’ evaluation procedures and decision making processes. The theory suggests that consumers’ behavioral decisions while considering alternative products or services are made according to the utility (benefits) maximizations. Therefore, this study assumes that investigating the perceived value of social media marketing will help in better understand its influence of behavioral loyalty and OWOM.

Loyalty

Customers loyalty which is one of the most well-established and well-recognized marketing concepts can be defined as "customer’s attitude and behavioral intentions towards the goods/service offered and actual repeat purchasing behavior” (Mandhachitara et al., 2011, p. 123; Kotler and Armstrong, 2008). Previously, customers’ loyalty used to be assessed by behavioral loyalty only i.e. repeat purchase and recommendations to friends and families (Mandhachitara et al., 2011; Rundle-Thiele, 2005). However, this conceptualization fails to distinguish between real and fake loyalties (Oliver, 1997). Loyalty is posited to be regulated by consumers' value and the link between perceived value and loyalty was established by number of researchers (Sirdeshmukh, Singh, Sabol, 2002; Yang and Peterson, 2004; Li and Green, 2012; Chahal and Kumari, 2011). However, there are lack studies that investigated this relationship in the context of social media and in web 2.0 applications. Therefore, this study proposed to examine these relationships in such an emergent dynamic context.

Identified Gaps

A review of literature identified the following gaps, which is sought to be addressed by the present work:

1. Scant attention has been paid to investigate the concept of social media marketing in developing counties, especially Saudi Arabia.
2. Only little is known about the perceived value of social media marketing and its influence on behavioral loyalty.
3. There exists wide potential towards investigating the relationship between OWOM and behavior loyalty. This will help in finding out whether the online consumer behavior follows the same pattern as that of the traditional WOM.
4. There exists scant literature about the perceived value of social media marketing and the OWOM. An examination towards this direction is expected to provide new insights to the academic field and business practices.

Research Objectives

The identified knowledge gaps based on the review of literature has enabled in developing the aim of this study. The study aims to examine the perceived value of social media marketing towards consumer behaviors. It also intends to look into the influence of OWOM on behavioral attitudes. Based on the review of literature and the aims of the study, the following objectives are identified for the study:

1. To examine the perceived value of social media marketing in the Saudi Arabian context.
2. To develop a conceptual model that relates the perceived value of social media into OWOM.

3. To investigate the role of OWOM on behavioral loyalty
4. To provide appropriate insights to business practitioners that will help in the enhancement of the practices of social media marketing in Saudi context.

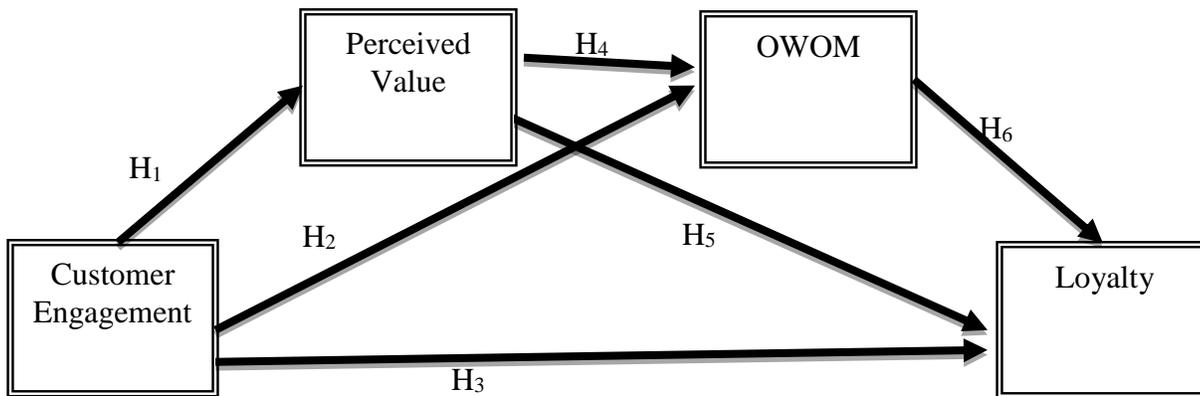
Hypotheses for the study

Based on the thorough review of literature and the objectives identified for the stud, the following hypotheses were identified for the study:

- H₁: There is significant positive relationship between Customer engagement and Perceived Value of social media marketing.
- H₂: There is significant positive relationship between customer engagement and online word of mouth.
- H₃: There is significant positive relationship between customer engagement and loyalty.
- H₄: There is significant positive relationship between perceived value and OWOM.
- H₅: There is significant positive relationship between perceived value and loyalty.
- H₆: There is significant positive relationship between OWOM and Loyalty.

The proposed model to be examined based on the hypotheses identified for the study is presented as Figure 1. The model consist of four main constructs; customers engagement with social media, perceived value of social media marketing, OWOM, and behavioral loyalty.

Figure 1. Hypothesized Relationship between Customer Engagement, Perceived Value, OWOM and Loyalty



Sampling

The population of the present study is Saudi citizens having social media accounts, and are following at least one business account. These platforms were selected to be the channel of this study due to their popularity in Saudi Arabia. It is estimated that there are about 17.4 million internet users in Saudi Arabia, opening up wide opportunities for online marketing. BBC (2015), states that Saudi Arabia is the largest social media marketing nation in the Middle East region. It is estimated that there are more than eight million Facebook users and over 3.7 million active Twitter users in Saudi Arabia (Al-Khalifa, 2015).

There is no second opinion that proper and scientific sampling is a prerequisite for a professional empirical work. According to Levine, Berenson & Stephan (1999), 385 samples are required for a population that exceeds one million (at 95% confident level and with 5% standard of errors, to achieve 5 standard deviations and z-score of 1.96). Another aspect that need to be considered is the minimum number of sample required to run an accurate analysis of the PLS software. According to Hair, Hult, Ringle & Sarstedt (2013) a minimum of 200 cases are required to generate valid results on PLS. Based on these standards, and to have a wider spread of samples, data were collected from a sample of 525 respondents. The researchers adopted a snow ball sampling technique to choose the samples. Since the questionnaire was administered online with all the statements being made essential, there was no missing data.

Data collection tools

The required data for the present study was collected through online questionnaires. Four questionnaires were used to collected data for the study, the details of which are as follows:

Table 1. Tools used for data collection

No	Questionnaires	Reference	No of items	Alpha
1	Perceived value 1. Economic 2. Social 3. Emotional 4. Functional	Sweeney, et al (2001)	16 4 4 4 4	.765 .739 .770 .777
2	Loyalty	Harris, et al (2008)	6	.802
3	OWOM	Filieri(2015)	4	.747
4	Customer engagement	Sjöqvist(2015)	4	.762

The questionnaires were administered after being translated into Arabic language, for a better understanding. The questionnaires had a 5 point scale which ranged from “Agree Strongly” to “Disagree Strongly”, with the former indicating higher value. The respective developers of the questionnaires have presented high Cronbach Alpha for their tools. However, for the sake of assessing the suitability of the tool in the Saudi conditions, the Alphas were assessed (Table 1). It can be observed that the Alphas of all the tools are above the stipulated .70 (Nunnally, 1978), thus enjoying the required reliability. The demographics of the sample were also collected.

IBM SPSS was used for the required data screening, cleaning and analysis. Consequent to data cleaning, Smart PLS or path coefficient analysis was conducted. Table 2 presents the characteristics and breakups of the sample utilized for the study.

The breakup of the sample is presented in Table 2.

Table 2. Demographic particulars of the sample

	Particulars	Number	Per cent
Age in years	Under 20	63	12
	20 to 29	168	32
	20 to 39	126	24
	40 to 49	126	24
	Above 49	42	8
	Total	525	100
Educational qualification	High school	21	4
	High diploma	63	12
	Graduation	294	56
	Master	126	24
	Doctorate	21	4
	Total	525	100
Annual Income in Saudi Riyal	Less than 50,000	2	0.4
	From 50,000 to 1,00,000	103	19.6
	From 1,00,001 to 1,50,000	210	40.0
	From 1,50,001 to 2,00,000	147	28.0
	Above 2,00,000	63	12.0
	Total	525	100
Usage of social media (Hours per week)	Less than 10	42	8
	10 to 19	21	4
	20 to 29	210	40
	30 to 39	168	32
	40 and above	84	16
	Total	525	100

It can be observed from the demographics presented in the above table that there is wide diversity with respect to the sample collected and is representative in nature.

4. Results and Discussions

Descriptive Analysis

The descriptive statistics are presented in Table 3.

Table 3. Descriptive statistics

No	Variable/Factor	Min.	Max.	Mean	SD
1	Economic	1.00	5.00	3.4400	.98654
	Social	1.00	5.00	3.5833	.85735
	Emotional	1.00	5.00	3.3924	.93431
	Functional	1.00	5.00	3.5600	.90993
2	Loyalty	1.00	5.00	3.6866	.84713
3	OWOM	1.00	5.00	3.7771	.91783
4	Customer engagement	1.00	5.00	3.6600	.90330

Note: N = 525

Measurement model

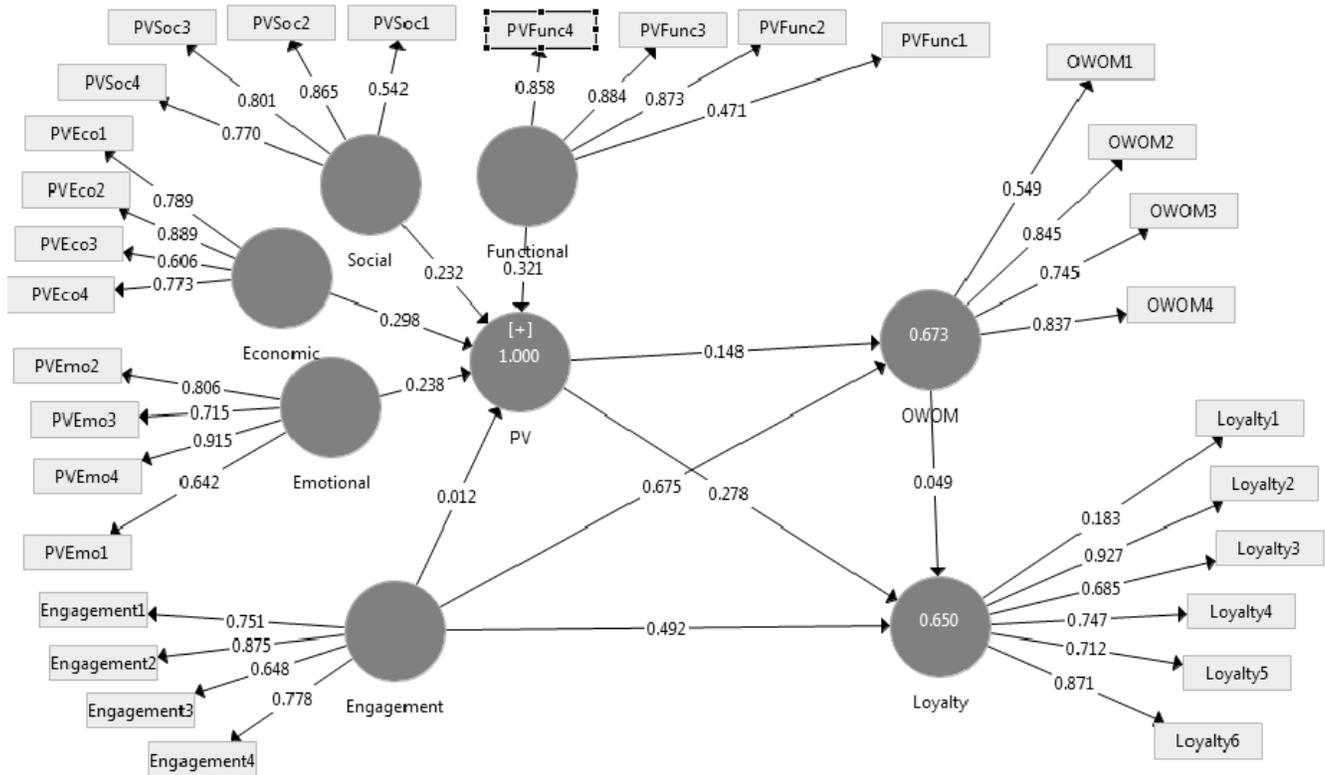


Figure 2. Measurement model

Great care has been exercised while arriving at the model for the study. This is all the more important in the case of a causal model, which attempts to explain how changes on the part of variable(s) could cause changes other variable(s). Based on established norms (for instance, Lowry and Gaskin, 2014), the causal inferences were made based on the three assumptions of covariation, non existence of probable spurious relationships, and the “temporal precedence”.

Since there were issues with respect to the measurement model a few items with comparatively low values had to be dropped. This has helped in arriving at a better model. The final model with the various effects and the explained variances in the endogenous constructs are presented as Figure 3.

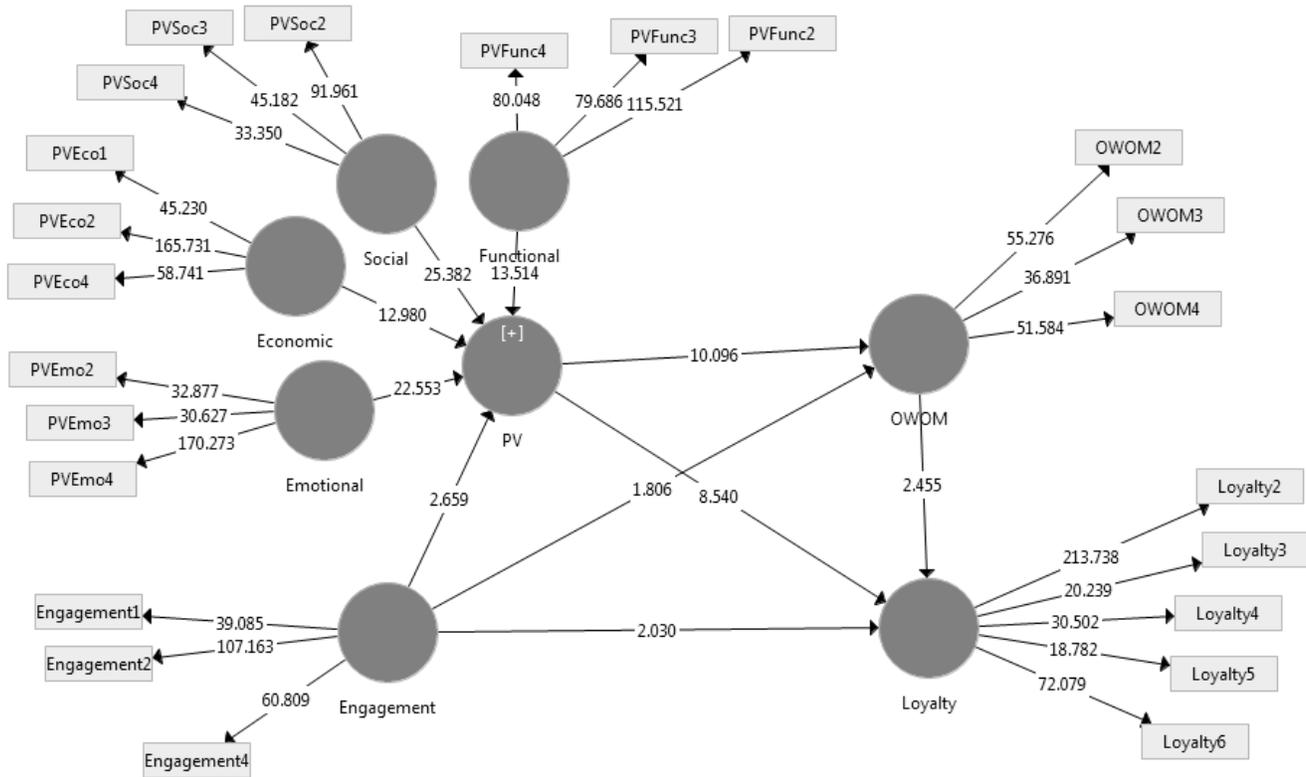


Figure 3. Final model

The measuring model is based on convergent and discriminant validities, and internal consistency reliability (Ringle, Silva, and Diógenes de Souza, 2014). The convergent validity is obtained by observing the Average Variance Extracted (AVEs). The AVEs need to exceed the required threshold value of 0.50 (Henseler, Ringle, and Sinkovics, 2009). Those which are having values below 0.50 are required to be dropped from the model. It can be observed from Table 3 that all, but the Overall PV, exceeds the threshold value of 0.50

The internal consistencies are predicted by Alpha and the Composite Reliability (CR). This will help in evaluating the bias of the sample. The required threshold value for Cronbach's Alpha is 0.70 (Nunally, 1978). It can be observed from Table 3 that all the variables have Alphas values above the stipulated limit. The Alphas range from .772 to .923 denoting adequate reliability. Those CR values above the rule of the thumb of 0.70 are considered satisfactory (Hair et al., 2010). From Table 3, it can be seen that all CR values are above the required threshold limit. The CR values are found to range from 0.868 to 0.934. These values satisfactorily meet the stipulated threshold.

Table 3. Descriptive Statistics of Summated Scales

Variables/ Factors	Average Variance Extracted (AVE)	Cronbach'sAlpha	Square Root of AVE	Composite Reliability
PV (Economic)	0.716	0.801	0.814	0.883
PV (Emotional)	0.689	0.770	0.803	0.868
PV (Functional)	0.780	0.859	0.859	0.914
PV (Social)	0.687	0.772	0.778	0.868
Loyalty	0.630	0.849	0.869	0.893
Engagement	0.703	0.791	0.811	0.877
OWOM	0.714	0.801	0.801	0.882

The results pertaining to the discriminant validity of the scales are presented in Table 3 and 4. The results presented in the two tables establish that the constructs identified for the study are independent of each other (Hair et al., 2016).

From Table 4 it can be observed that the values of Square Root of AVEs (presented in the diagonals of the table) for all the identified latent variables are greater than the inter-correlations (r). These values suggest that the discriminant validity of the scales used in the study, as proposed by Fornell and Larcker (1981) is met.

Table 4. Inter-correlations (Fornell and Larcker (1981) Criterion)

	Engagement	OWOM	PV	Loyalty
Engagement	0.811			
OWOM	0.596	0.801		
PV	0.670	0.574	0.942	
Loyalty	0.560	0.603	0.543	0.869

Note: All correlations are significant at .01 level

The factors that have been extracted and the loadings of the items are presented as Table 5. These factor loadings indicate that all items were loaded on their respective constructs between 0.740 (lower bound) and 0.931 (upper bound) on their respective construct. These values also provide further support in the confirmation of discriminant validity of the tools used for the study.

Table 5. Outer Model Loadings and Cross Loadings

	Economic	Emotional	Functional	Social
PVEco1	0.811			
PVEco2	0.904			
PVEco4	0.820			
PVEmo2		0.786		
PVEmo3		0.764		
PVEmo4		0.931		
PVFunc2			0.894	
PVFunc3			0.890	
PVFunc4			0.865	
PVSoc2				0.879
PVSoc3				0.818
PVSoc4				0.788

Structural Model Assessment

On establishing the reliability and validity of the latent variables in the structural model, the assessment of the structural (inner) model was considered. For having the final structural model, bootstrapping technique was done. The results of the bootstrapping are presented in Table 6. It can be seen that all the paths maintain significant p values at various levels ($p \leq 0.01$, $p \leq 0.05$ and $p \leq 0.10$). The model values are presented in Table 7 which throws further light on the complex relationship between the variables.

Table 6. Bootstrapping results

	Original Sample	Sample Mean	Standard Deviation	t-value	P Values
Economic -> PV	0.184	0.184	0.014	12.980	0.000
Emotional -> PV	0.249	0.248	0.011	22.553	0.000
Functional -> PV	0.344	0.345	0.025	13.514	0.000
Social -> PV	0.267	0.267	0.011	25.382	0.000
Engagement -> Loyalty	-0.259	-0.257	0.128	2.030	0.042
Engagement -> OWOM	-0.187	-0.186	0.104	1.806	0.071
Engagement -> PV	0.064	0.063	0.024	2.659	0.008
OWOM -> Loyalty	0.115	0.114	0.047	2.455	0.014
PV -> Loyalty	0.957	0.956	0.112	8.540	0.000
PV -> OWOM	0.925	0.924	0.092	10.096	0.000

Table 7. Model values

	R ²	β	F value
Engagement -> PV	.941	.970	8392.234
Engagement -> Loyalty	.577	.760	713.280
Engagement -> OWOM	.634	.796	904.931
PV -> OWOM	.774	.868	781.071
PV -> Loyalty	.743	.743	643.386
OWOM -> Loyalty	.603	.556	298.651

Note: All F values are significant

Structural model analysis

As a final step of analyzing the structural model, the standardized root mean square residual (SRMR) was assessed to arrive at the goodness of fit (Henseler, Ringle and Sarstedt, 2015; Hu and Bentler, 1998). The PLS analysis has served the dual purpose and has succeeded in establishing the validity of the instruments used for the study, as well as the theoretical relationships among the variables (nomology).

Results based on hypothesis

An examination of the structural model has also highlighted, beyond doubt, the positive relations between variables studied. The significance found in the structural coefficients and the size of effects provides the required guidelines for the results, based on research hypothesis formulated for the study. All the hypotheses formulated for the study is accepted, revealing the complex relations between the variables studied. The findings have providing further insights regarding the behavior of consumers regarding OWOM and customer loyalty. The results based on the hypothesis are presented below:

- H₁: CE -> PV.
- H₂: CE ->OWOM.
- H₃: CE -> Customer Loyalty.
- H₄: PV->OWOM.
- H₅: PV -> Loyalty.
- H₆: OWOM-> Customer Loyalty.

Research Significance

The findings of the study have provided some significant insights to both academic and business fields. This significance is all the more important since there are paucity of studies in the area of social media marketing in the Saudi context. Moreover, the present study is one of the few studies that have investigated the perceived value of social media marketing, in general, and OWOM in particular. The study has also provided deep understanding of the online behavior loyalty and the factors that influence it i.e. OWOM and perceived value of social media marketing.

The practical contribution of this study provides insight to marketing managers and online communication specialist to enhance the current practices of social media marketing in order to communicate marketing messages in efficient and effective way. Finally, it has also provided contextual contribution to better understand the online consumers' behaviors, which will, in turn, facilitate the promotion of better business environment in Saudi Arabia. This finding can also be generalized to other contexts that share similar characteristics i.e. Islamic, Arabic and developing countries.

5. Conclusion

The present study has made several significant contributions to online marketing literature and to the business practices as well. The study has succeeded in enhancing the current understanding of the perceived value of social media marketing in Saudi Arabia in particular and the field of Social media marketing in general. This is expected to have profound impact on both academic field and business practices. Being the first study to be conducted in the Saudi context, it provides further significance and is of paramount importance.

That the study has empirically examined the influence of OWOM on behavioral attitudes of consumers also is of profound importance to marketing literature. This examination has successfully responded to the recommendation of Daun et al. (2008). Thus it succeeded in filling the knowledge gap in this area. The significance of the study emerges from the fact that previous studies have either examined the influence of OWOM or the perceived value of social media marketing. The present work has succeeded in developing an integrated framework that encompasses certain important constructs within the same model. This can be considered as an original contribution to knowledge, which will help in improving the current practices in this direction. That the Islamic characterizes are unique in nature has been established in many earlier studies (Shalaby, 2008). As the study has absorbed the unique culture and distinct Islamic characteristics of the Saudi contexts, it is expected to open up the concept to a wider horizon and the consequent further examination.

The revealing of the complex relationship of OWOM with the other examined factors will go a long way in contributing towards better practices in local, regional and international businesses in the area of social media marketing. It is expected that the results of present study, which has empirically proved the complex inter-relationships will promote superior practices in the area of social media marketing in Saudi Arabia. Though there is a need of generalization, it can be inferred that the findings would be applicable among other Islamic, Arabic and developing countries. Further, it is also expected that the result of the study will induce in the minds of researchers the inquisitiveness to explore deeper into this interesting topic.

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INDUSTRY 4.0 AND NATIONAL SECURITY: THE PHENOMENON OF DISRUPTIVE TECHNOLOGY

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Abstract. Fourth Industrial Revolution, based on digital platforms is characterized by a convergence of technologies that is blurring the lines between the physical, digital, and biological spheres. These phenomena disrupts patterns of development and opens new paths to development. (WEFORUM. 2018) Digital technology development presupposes methodological challenges not only to business or individual interest, but holistic approach to national security issues. Hybrid threats, economic crises, social inequalities, and labor migration are among the main challenges of global security. What are possible manifestations of disruptive technology in national security interest in the broader sense? Is it possible timely to identify and react to threats to competitiveness, "job killer" or law system? Critical infrastructure are parameter, which identifies assets or system as element of security. Topic reveals interaction between disruptive technology and critical infrastructure in the context of national security. Authors argued, that the theoretical insights, obtained by document analysis, classification, critical analysis, abstraction methods will be useful in practical use, to provide expert knowledge and a deeper understanding of manifestations of disruptive technology in security issues at all levels.

Keywords: critical infrastructure; disruptive technology; fourth industrial revolution; national security

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1. Introduction

With the changing global security situation, increase in external threats or emergence of new ones (cyberattacks, on-conventional warfare models, etc.), countries must feel concern regarding consolidation of their security (Novikovas et al., 2017). The fourth industrial revolution (4.0) will have a profound impact on the nature of state relationships and international security, changing the character of security threats while also influencing shifts of

power, which are occurring both geographically, and from state to non-state actors (Schwab, 2016). It's no doubt, that 4.0 is disrupting economies and societies, redefining the business landscape, often in unexpected ways. Governments and organizations of the world understand that the main efforts should be taken to provide security for their critical infrastructure because only this can ensure the wellbeing of the country and its people, especially when critical infrastructure and energy security has become an argument for political decisions making (Tvaronavičienė, 2018).

Mentioned, that 4.0 are based on digital technology, which determine interconnects and interdependencies between various sectors of social life. Government institutions, banking sectors, public and private services, nuclear power plants, power grid operators, water suppliers or waste water treatment companies use information technologies in their day-to-day operations. Everything that uses technologies are based on communication and information systems and that means that it depends on cyber security (Limba et al., 2017).

Emerging technologies presuppose new methodical-theoretical approach of security issues. For example, the manifestation of interest groups in legislative process, using combination of various digital lobbying activities (e-lobbying), or electing system as law institute can be identified as element of critical infrastructure, that's means-element of national security. The vulnerability of the electoral system or the implementation of transparent lobbying activity can result corruption and/or the underground (shadow) economy, what can be an obstacle for sustainable development, which requires respective favorable multi-faceted environment (Stankevičius, Lukšaitė, 2016; Tvaronavičienė, 2016).

To disclose a precise definition of security is not simple. In one case, it can be too narrow, others- too wide. European Union Internal Security Strategy 2015-2020 as the priorities identified „fight against terrorism, serious and organised crime and cybercrime“, and highlighting that „keeping our citizens safe is the main duty of our Governments“. Treaty on the Functioning of the European Union- (TFEU) establishes “an internal market, which shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress”. Above mentioned, presuppose to identify public, economic, social, ecological-environmental, cyber securities. Security, as a evolutionary phenomenon disclosed according to critical infrastructure (CI) definition. “Critical infrastructure“ means an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions. (Council Directive 2008/114/EC Article 2). Authors suggest, that CI may be used to explore the impact of disruptive technology on security issues, while threats are difficult to understand and have resultant nature.

The theory of disruptive innovation was invented by Clayton Christensen. Theory tells us that certain innovations can undermine existing products, firms, or even entire industries. According to C. Christensen, disruptive innovation – an innovation, employing a ‘technology’ in management, marketing activities and investment policy which transforms information, labour, capital, and materials into products or services of greater value, which becomes the main goal of a company, and, as a consequence, fundamentally changes the established ‘rules of the game’ in many industries. If a certain technology plays a critical role in a disruptive innovation, it could be defined as “disruptive technology” (DT) (Christensen, Bower, 1996). It determines understanding, that DT is perceived as a process. It is noteworthy, that “Disruptive technology&disruptive innovation” have been of scholarly interest for years, but there is still a need to better understand the nature of disruptions and their relationship to emerging technology processes (Li et al., 2018).

While threats from new technologies are still nascent, difficult to understand or lack legal protections. Therefore, the theory of disruptive innovation can be applied to various industrial contexts: from high-tech to low-tech, and

from lagging to rapidly changing environments. The big number of articles shows high relevance of DT in future industries (see table No 1).

Table 1: Count of publications in selected emerging or disruptive technologies using either an emerging or disruptive technology framework (Indexes = SCI=EXPANDED, SSCI, A&HCI, ESCI; Timespan = 2006 – 2015)

	Emerging Technology	Disruptive Technology
Nanotechnology	354	15
Big data	10	7
Internet of things	19	1
Electric vehicle	31	1
3D printing	13	6

Source: Li, M., Porter, A.L., Suominen, A.

2. Problem formulation and methodology

The impact of changes, to security, based on DT, can occur in various aspects: for a specific business model, specifically for infrastructure or for a specific investment. The effect may be the creation of a new economic activity, existing modification or destruction. The strategy of security must ensure prevention, detection and response to possible treats in these aspects. The main challenge for governments is timely adoption law norms and principles, solving these problems.

For example cryptocurrency is an innovative payment network and a new kind of money, based on digital technology. The question- how cryptocurrency are influencing EU or its country members economic or financial security? What is response and preparedness from legislative subject, regulating this phenomenon? Is it new form of money, or its element of shadow economy (authors term "shadow economy" use wide meaning, which includes tax evasion, money laundering, corruption, violations of competitiveness and busines activities outside law regulation)?

According to TFEU article 3, “The Union shall establish an economic and monetary union whose currency is the euro“ and does not provide for exceptions or other alternatives to the EU currency. Cryptocurrencies phenomenon have become actual, unregulated problematic issue, presuppose national and regional authorities to solve with law regulation. For example, Polish National Bank and the Financial Supervision Commission jointly issued a warning against investing in virtual currencies, citing price volatility and the risk of fraud, Bank of Lithuania stated, that „financial market participants should not provide services associated with virtual currencies,“ the Finance Minister of Slovakia had noted, „that trade in cryptocurrencies, which is unregulated and anonymous, involves risks of terrorism and organized crime.“

Disruptors such as Coursera, Airbnb, Waze, Uber redefining not only the perception of the business sector (its clear, that education or taxi industry will never be the same), but also systematic approach to public administrative management. The government protects and regulate the labor market, competitiveness, consumer protection-approve licenses, defining tax policy and establishing a business environment. Question – are these provision properly and timely implemented?

Coursera, Airbnb or Uber represents business sectors (education, accommodation, taxi) which are licensed or include mandatory provisions, for example hygienic, technological or tax accountability. For example, in Uber or Airbnb case its not clear the question of labour law (employee status, social security or social contributions),

administrative law (licensing, ensuring and enforcing mandatory technical requirements), tax law (appropriate implementation of fiscal policy).

„Yandex. Taxi“ case in Lithuania revealed a systemic problem that concerns legal regulation, technological interdependence, public trust in governance aspects.

The National Cyber Security Centre under the Ministry of National Defence of Lithuania carried out initial analysis of “Yandex. Taxi” application for smartphones, which was actively offered for Lithuanian users since 26 July 2018. The analysis of the application revealed that it requires access to a large amount of sensitive data and permissions to device functions, which might be excessive. The app has the ability to turn on the device camera and microphone (take pictures and videos, record sound), access contact list (phone book, social media accounts’ information), control the phone call services, identify phone status and identity, control the text message service (intercept messages), modification or deletion of the contents on the smartphone’s storage, determine precise GPS location of the device, manage network access (receive data, monitor and control network connections, manage Wi-Fi access). Analysis showed that the app regularly connected and exchanged data with 11 unique IP addresses (10 of which are of the Russian Federation) via encrypted channels. It should be noted that, this analysis has recommendatory nature, but in public discourse determined contradictory opinions. Its not clear, is a threat to national security interests or not?

Attention is, however, to be focused on the fact, that DT manifest to security issues straightforward nature - through the main economic activity and indirectly through technological interdependence (for example, uber, airdnb, coursera are based on digital platforms (mobile app)).

Authors reveals classification of DT and CI, and provides a comparative analysis of these phenomena, according law and scientific documents, literature.

First classification of DT is based in terms of timing (early/late) and reaction to changes, (external/internal). It leads to understand awareness of technology’s potential and better understanding the strategy of response to DT, which involves a three-step process: building awareness (sensing), building capability (responding), and building commitment (scaling) (Birkinshaw et al., 2018).

Content of these classification presuppose to compare DT as CI, according to following analysis.

CI are distinguished in external (outside EU) and internal (inside EU). Internal are possible to divide to European CI (which are of the highest importance for the Community and which if disrupted or destroyed would affect two or more MS, or a single Member State if the critical infrastructure is located in another Member State) and National CI (These criteria would be developed by each Member State taking into account as a minimum the following qualitative and quantitative effects of the disruption or destruction of a particular infrastructure) (COM (2006) 786).

Second: analysing DT that are potentially disruptive to business, to government, and to society by two levels of disruptive technologies. Its possible to identify two levels of of disruptive technologies: a) disruption is a localized change, within a market or industry, b) disruption has much larger influences, affecting many industries and substantially changing societal norms and institutions (Schuelke, 2018).

Criteria referred to identify critical infrastructure comprise the following: *economic* effects criterion (assessed in terms of the significance of economic loss and/or degradation of products or services; including potential environmental effects); *public* effects criterion (assessed in terms of the impact on public confidence, physical

suffering and disruption of daily life; including the loss of essential services); *political* criterion. (Council Directive 2008/114/EC).

Third. Technological interdependence of DT. Inter-dependence is a major challenge for risk management in critical infrastructure. This is because economies and societies rely on interdependent and inter-connected infrastructure systems. This gives rise inter alia to a phenomenon known as “cascading events” – that is, once one disruption occurs, others are likely to follow within systems and processes that are connected to the infrastructure affected by the initial disruption (OECD 2008). The same indications are inherent to CI: “The identification and analysis of interdependencies, both geographic and sectoral in nature, will be an important element of improving critical infrastructure protection in the EU”. (COM(2006) 786).

3. Discussion

The disruptive changes brought by the fourth industrial revolution are redefining how public institutions and organizations operate, mentioned external and internal nature. Its presupposes countries and governments relate to each other: the interconnected and interdependent nature of today's economy and society means that even a disruption outside of the EU's borders may have a serious impact on the Community and its Member States. (COM(2006) 786). The main problem of the increasing vulnerability can be associated with the complexity of the system and integration process: the small elements of the systems or small systems are integrated into larger systems which increases the system complexity and creates conditions for vulnerabilities to arise not only in domestic but also in countries interconnected systems; new modern technology usage is usually motivated by the increasing need for efficiency, but it is not considered from the security and especially cyber security position due to a lack of proper understanding of the vulnerable areas and limitations as well as a lack of possibilities to enforce the responsibility of private sector players to reduce the effect of their negligence on society or some part of society (Kroger, 2008).

Examples Cryptocurrency or Yandex Taxi cases reveals discussion about “Broken Windows” theory and regulating these examples. Wilson and Kelling, who advocated for stopping smaller crimes by maintaining The Environment In Order To Prevent Bigger Ones, brought the theory. While is not clear status of cryptocurrency, social-legal relations in this area reminiscent of “fight without rules”: not clear tax regulation, protection of law values etc. Case of Yandex Taxi disclose another discussion: Lithuanian Institution issued recommendations for applications safe usage, but others neighbour countries – dont. In one hand, we can identify these situation as a law loophole – we have unregulated, existing situation, which generating monetary circulation. According to “Broken windows” theory, - bad habits and behaviours tend to be contagious allow some ideas or behaviours to “spread like viruses” (Wilson, Kelling, 1982). Other hand - social, legal, financial instability between government, business and society. For example Yandex Taxi case – it Is possible to determine the legal discussion on the protection of competition, presumption of innocence, reputation or freedom of economic activity.

Authors argued, that methodological classification of DT, disclosure possible interaction between DT and CI in the context of security.

Technological interdependence between CI elements presupposes to reveal discussion about interaction between DT and cyber security. Its possible to identify mutual problematic aspects to security issues. As mentioned above, DT can directly affect national security in different vectors, for example economic or competitiveness fields. More deeper problem exist vulnerability of DT in case of cyber security. These problem define not only private interest, but also public. For example, if we define cryptocurrency define as a currency (money), its presupposes reliable, secure billing instrument meaning, which must be resistant to fraud, illegal cyber trick or digital counterfeiting.

Hence, its necessary to ensure not only security of network and information systems but also juridical, economic and tax aspects. According to Directive (EU) 2016/1148- ‘security of network and information systems’ means the ability of network and information systems to resist, at a given level of confidence, any action that compromises the availability, authenticity, integrity or confidentiality of stored or transmitted or processed data or the related services offered by, or accessible via, those network and information systems.

Lithuanian Cybersecurity law defines cyber security as a set of legal, information dissemination, organizational and technical measures which are needed to be taken to prevent, detect, analyze and respond to cyber incidents, which are described as the event or activity that causes or may cause or allow: unauthorized access to communication and information systems (CIS), electronic communications networks or industrial process control systems; can disrupt or change information systems, including the management takeover; electronic communications networks or industrial process control operations to destroy, damage, delete or modify electronic information, withdraw or restrict access to electronic information, as well as enable to absorb or otherwise use non-public information in electronic format by unauthorized persons (Law on Cyber Security of the Republic of Lithuania, 2014). Nowadays when the threats are increasing rapidly, you need to think about the solutions that have more complex measures. It is time to think about a cyber security management model which has considered all strategic aspects, without limitation only a technical issue (Limba et al., 2017).

The existing capabilities are not sufficient to ensure a high level of security of network and information systems within the Union. Member States have very different levels of preparedness, which has led to fragmented approaches across the Union. This results in an unequal level of protection of consumers and businesses, and undermines the overall level of security of network and information systems within the Union. Lack of common requirements on operators of essential services and digital service providers in turn makes it impossible to set up a global and effective mechanism for cooperation at Union level. Universities and research centres have a decisive role to play in spurring research, development and innovation in those areas. (Directive (EU) 2016/1148).

Consequently, the disruption that the fourth industrial revolution will have on existing political, economic and social models will therefore require that empowered actors recognize that they are part of a distributed power system that requires more collaborative forms of interaction to succeed. (WEFORUM, 2018).

4. Conclusion

It should be emphasized, that DT is identified as CI by three criteria, established by the EU law regulation.

Understanding and modelling potential technological disruptions as critical infrastructure in the context of security issues, will require taking a holistic perspective. It will help to improve security culture: better understand the boundary between disruptive technology as a sustainable phenomenon and security aspects.

Exploratory analysis of DT examples presuppose provision, that legal regulation appears to be routine (delayed) in response to the consequences, but not to prevention or regulate current situation. This leads to a collision of double standards - in one case, the negative impact of technology on security issues (Yandex Taxi LT, Cryptocurrency) is emphasized, otherwise the guarantee of freedom of initiative of the economic activity guarantees the providers of technology with legitimate expectations. An appropriate, timely adapt law system to changes, primary feature of successful sustainable development and economy. The timely identification of DT as CI is likely to help identify the potential threats to security principles properly and clearly.

Study revealed, that there is a need systematically to develop research interaction between DT and cyber security, responding effectively to the challenges of security of network and information systems, law regulation aspects.

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FOOD SECURITY AS A PRELUDE TO SUSTAINABILITY: A CASE STUDY IN THE AGRICULTURAL SECTOR, ITS IMPACTS ON THE AL KHARJ COMMUNITY IN THE KINGDOM OF SAUDI ARABIA*

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Abstract. Food security is an absolute necessity for human wellbeing. Food insecurity could adversely affect national security and sustainability. As food security is reliant on agriculture, self-sufficient agricultural industry is the basis of the economic strength of any nation. The current food supply in the Kingdom of Saudi Arabia (KSA) from the available domestic sources is far below the required domestic demand. The country meets its food requirements through imports, which is as high as 80%. The present study investigated the problems faced by the agriculture sector in Al Kharj region. The data for the study has been collected through field visits in farms in Al-Kharj. The study has succeeded in identifying the problems faced by the farmers of the region, and has made some suggestions. Though the study is conducted in one region of the country, it has applicability in the entire Gulf region, as the problems faced by them are same and similar in nature. It is expected that the study will act as a trigger for further research.

Keywords: agriculture; sustainability; food sustainability; Saudi Arabia

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1. Introduction

Food security and sustainability are closely related topics, and the two have been subjected to studies in multitudes of dimensions (Sulphey, 2017; Sulphey & Safeer, 2017; Sulphey & AlKahtani, 2017; Tireuov, Mizanbekova, Kalykova & Nurmanbekova, 2018). For any country, food security is paramount to human wellbeing and is akin to national security and sustainability (Tvaronavičienė, 2018). Food security is totally reliant on agriculture. Self-sufficient agricultural industry is considered as the very basis of the economic strength of any nation (Akhmetova & Suleimenova, 2018). Threats to food security will undermine the very foundation of any country (Skrypnyk, Tkachuk, Andruschenko & Bukin, 2018). It is estimated that the present food supply in the Kingdom of Saudi Arabia (KSA) from the available domestic sources is far below the supply daily domestic demand. This occurs due to limitations in the kingdom with respect to a host of aspects including availability of cultivatable land and water.

KSA is unique with respect to many aspects (Sulphey, AlKahtani & Syed, 2018). With an approximate area of 2,149,690 square km is the largest country in Arabia, with an estimated population of over 30 million (Ministry of Economy and Planning, 2014). The country has only 1.6% of the total land mass as arable and the per capita arable land are very low at 0.11 ha (World Bank, 2018). Globally this is one among the lowest. In the past few decades Saudi Arabia has undergone remarkable social and economic development. The harsh extreme climatic conditions of the country are not conducive to farming. Despite this, the country has time and again initiated a large number of agricultural schemes and programs with a benign objective of ensuring food security and to have inclusive development of the society (Bailey & Willoughby, 2013). A few schemes initiated in the recent past include agricultural expertise, credit schemes, farmers' responsive plans, free agricultural land distribution, intensive extension programs, etc. These schemes have helped in enhancing substantially the yield of fruits, vegetables, flowers, cereals and a host of veterinary products including cattle and poultry feed (Fiaz, Noor & Aldosri, 2016).

The various schemes and programs adopted by the Government enabled the country to export food surplus in the early 2000s (FAO, 2009). However, the realization that the existing scarce water resources in the region need to be provided the due consideration, prompted the Kingdom to rollback the intensive agricultural production program. This decision was taken as intensive agriculture resulted in disproportionate use of non-renewable natural resources (Al-Subaiee, Yoder & Thomson, 2005). As a result of this the contribution of agriculture to GDP in KSA, towards the end of the decade decreased to 4.7% (from 5.2%). However, the country succeeded in maintaining stability in the volume of production due to enhanced productivity (Ministry of Agriculture, 2008).

The country has been categorized as "water stressed", and is considered to face acute water shortage by the year 2050 (Falkenmark, Rockstrom & Karlberg, 2009). According to Baig & Straquadine (2014) the non-renewable aquifers of the country is being depleted at a rapid pace as a result of adoption of un-sustainable farming practices. This situation points towards the definite need for self-sufficiency in food production. Due to the unique situation prevalent in Saudi Arabia, sustainable food security can be attained only through the adoption of modern agricultural technologies that are capable of improving productivity (Fiaz, et al, 2016).

The kingdom has 3850 cubic meters per year available groundwater, whereas, the surface water is 1300 cubic meters per year, which is variable and depends on annual rainfall. The kingdom's estimated total renewable water resources are about 500 km³, 340 km³ of which is economically feasible to extract. It is estimated that the kingdom is consuming an average of 24 billion cubic meter of water pa. According to Al-Hussayen (2007) agriculture sector uses that lion's share of this with 88%, followed by municipalities with 9%. The industrial sector consumes around 3%. The demand for municipal water is increasing exponentially due to the increasing

migration from rural areas, in addition to the average population growth of 3% (Ministry of Economy and Planning, 2005). The growth trend shows that in the near future, the available water resources will be incapable of meeting the rising demand. It is estimated that the available water from all sources (both non-conventional as well as conventional) will not be capable of meeting the demand gap of about 11.5 billion cubic meters per annum (Fiaz, et al, 2016). As stated earlier, despite depleting the non-renewable aquifers as a result of un-sustainable farming practices, (Baig and Straquadine, 2014), the country is meeting over 80% of its food requirements from imports (Baig, Al-Zahrani, Schneider, Straquadine & Mourad, 2018), creating further burden on the foreign exchange resources (as food is made available by the Government to the Saudi population at substantially subsidised rates).

Another problem plaguing the country is and adversely affecting food security is the large scale wastage. The Barilla Center for Food and Nutrition (2106) ranked Saudi Arabia among the top 25 countries that waste food. They have put the per capita annual wastage at a whopping 427 kg. The present study intends to find out the impediments to food security in the Kingdom of Saudi Arabia. The problems faced by the kingdom in agriculture are unique in nature. Coupled with it is the socio-economic and cultural factors of the country.

2. Review of Literature

Availability of food is essential for any society to thrive. Food availability is defined as “sufficient quantities of food of appropriate quality, supplied through domestic production or imports, including food aid”. In a broader level this availability is measured as the Average Dietary Energy Supply Adequacy (ADESA), which is expressed in terms of the ratio of “dietary energy supply” to the energy that is required from the diet. The concept of food security has been defined based on a number of dimensions and factors. Many definitions are available about food security.

Defining the concept

Food security is an extremely complex subject that involves a broad spectrum of disciplines like agriculture, economics, sociology, culture, engineering, entrepreneurship, environment, politics, human physiology, etc. The FAO (2009) states that food security occurs only “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (p.8). Though there are multitudes of definitions for food security, the most widely accepted one is that which has been provided by FAO (2010). According to them, food security is:

“a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”

In ordinary parlance food security is considered as the condition when all members of a society have both physical and economic access to either “buy, produce, obtain or consume sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life”. From the available definitions and literature, food security can be considered to be based on three aspects that are presented in Table 1.

Table 1. Basic Aspects of Food Security

No	Aspect	Description
1	Availability	<ul style="list-style-type: none"> The physical presence of the food (this can be grown or, produced locally, or made available through transfer in the form of aid or import).
2	Access	<ul style="list-style-type: none"> This involves the accessibility of the available food to the individuals. Access is said to occur only when all the members of the society have the required resources/money to have the required foods that provides them with a nutritious diet. Access is based on the income levels of the members in the respective societies

		<ul style="list-style-type: none"> • It is also based on the societal, institutional and market rights to which an individual is entitled. • Insecurities in the societies like conflicts, strife, uprisings, etc. could hamper the aspect of access. • Access could also be hampered for people with low income due to the collapse of possible protective safety net institutions.
3	Utilization	<ul style="list-style-type: none"> • This is the way members of the society use the available food. • Utilization of food is dependent of a host of factors like quality, production and storage, nutritional utility, health status of the consumer, etc. • Utilization could be affected due to diseases, improper sanitation, inadequate nutritional knowledge, cultural issues, demographics of the members, etc.

Food safety initiatives help in the reduction of food borne diseases among populations (Havas & Salman, 2011). According to Wakabi (2006) food insecurity in any economy would result in malnutrition and case the resultant exacerbation of health. It is also considered to suppress the immune system and make the population highly prone to diseases. Wolfe, Daszak, Kilpatrick & Burk (2005) is also of the opinion that food insecurity resulting from problems associated with access and availability would force populations to go in for alternate food sources, which could possibly expose them to diseases not known hitherto.

Rising urbanization has also been identified as an impediment to food security. The vulnerability of urban population to food insecurity and related complications was evident during 2007 and 2008 due to astronomical rise in the oil prices (Satterthwaite, Mcgranahan & Tacoli, 2010). This problem has strong applicability in KSA as the kingdom is 80% urban. Further, any potential issues at the Strait of Hormuz could also be detrimental to the interests of Saudi Arabia (Efron, Fromm, Gelfeld, Nataraj, & Sova (2018). A fair review of the existing literature shows that no studies have been undertaken in the dimension proposed by the researchers. The present study attempts to address this gap in literature.

3. Methodology

Qualitative case study research has been identified to address the proposed questions in the present work. Case study is often identified more as a research strategy than a method (Eriksson & Kovalainen, 2008). However, it has the capability to produce substantial quantitative data, though it may not result in generalizations based n statistical tools or quantitative and deductive findings (Ghuri & Gronhaug, 2005). It definitely is an ideal tool to conduct investigations about the complex cross relationships that may occur across various domains/environments like human, organization, society, etc. (Sulphey, in print). This method has the added qualification of having the required dexterity of being connected harmoniously to “interpretative, ethnographic and field-research studies” (Eriksson & Kovalainen, 2008). Yin (2003) has identified the steps required to conduct a successful qualitative case study, which was closely followed in the present study.

For having a better understanding of the problem under study, and have the views of farmers of diverse nature, the researchers classified the farms into small, medium and large. The first two types of farm have been included in the purview of the study. Since large farms have multitude of advantages like availability of immense resources at their disposal and their problems are altogether different in nature, they have been excluded from the purview of the study. The study was limited to small and medium farms in the Al-Kharj governorate.

The researchers have conducted filed visits in and around the Governorate of Al-Kharj and collected the required data from various stake holders like farm owners, government officials, farm managers/workers, etc. The researchers have used a form of unstructured interview to collect the required data for the study. The information so received was assimilated and discussed with experts in the field to arrive at the findings. Adoption of this

approach has helped the present researchers in successfully arriving at a thorough and holistic understanding of the issue under study. Though the study was conducted at the Al-Kharj Governorate of Saudi Arabia, the findings have wide application and relevance to the entire gulf regions, as all the countries in the region face same or similar problems.

4. Findings of the study

As stated in the earlier sections, the findings of the study were based on the data collected from the field researches. It was observed that most famers (both small and medium) were focusing on cash crops like leafy vegetables, tuber crops and certain other exotic vegetables that fetched high returns. Grains and cereals cultivation was observed to be cultivated only at a bare minimal rate. This indeed does not auger well as this may cause the country to import the entire chunk of its requirement. All farmers, irrespective of the size, were particular in cultivating date palms, as it is considered part of the culture in Saudi Arabia. However, it was found to be limited to certain parts of the farm land, as date palms provided only single harvest in a year. While medium farmers involved in poultry and dairy farming; the small farmers involved in poultry. These farming practices adopted by them helped in enhancing the fertility of the soil and aided in better yields.

All the farmers identified water availability as a major issue facing the farming industry. Since the country has dry and arid climate availability of water is a major challenge. Further, there is also the issue of falling water levels due to overexploitation and failing rain falls. Though the medium size farmers had their own irrigation wells and system, the high cost of electricity worked to their disadvantage. Most small farmers used the treated water supplied by the municipal authorities, though some of them had their own wells.

For a better understanding of the problems and the prospects, the findings of the study are presented in Table 2, based on the size of the farms.

Table 2. Findings based on the field visits

Size of farm	Problems	Prospects
Small	<ul style="list-style-type: none"> • Water availability for irrigation purpose • Availability of required seasonal labour • High costs for inputs like seeds, fertilizers, pesticides, etc. • Extension facility from the concerned departments • Timely requirement of funds for various purposes • Pest attacks • Drastic climatic variations • Marketing issues • Drastic price variations 	<ul style="list-style-type: none"> • Lower levels of investment requirements • High level of possibility of mobility between and among crops cultivated • Advantages of intercropping possibilities • Labour problem is not acute, due to lesser requirement •
Medium	<ul style="list-style-type: none"> • Water availability for irrigation and other associated purposes • High costs for inputs like seeds, fertilizers, pesticides, etc. • Higher levels of investments for infrastructure • High cost for expert labour • High electricity consumption and cost • Paucity of timely extension support from various departments • Marketing issues • Multiple pest attacks 	<ul style="list-style-type: none"> • Proper professional and scientific management of resources • Branding possibilities for products • Availability of experts in finance/ accounting, marketing, grading, etc. • Better acceptability by the vendors • Advantages due to economies of size • Advantages of multiple cropping • Availability of round-the-clock supervision and labour • Buying agreements will departmental stores and hyper pest markets

	<ul style="list-style-type: none"> • Drastic climatic variations • Drastic price variations for the products and associated marketing issues • High credit periods by vendors 	
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Another problem faced by Saudi Arabia is the alarming rate at which the country is getting urbanized. An early estimation done in 2014 found that approximately 83% of the country’s population reside in urban areas. Further, it was found to be increasing at the rate of 2% annually. At this rate, in the near future KSA will be fully urban in nature, directly affecting water availability, agriculture, the social fabric, etc. As another direct fall out of urbanization, the youth (even children of farmers) were found to be reluctant to involve in the vocation of agriculture. These aspects are bound to have its adverse repercussions in the near future, and need to be addressed urgently.

5. Suggestions

It is essential to make the country secure in terms of food availability. Towards this, the nations should utilize all resources available at its disposal. It should, on a priority basis, take all required steps to minimize the economic and social cost associated with food production. A national movement is also required to tackle food wastages. Towards this, there is an urgent need to formulate a national policy that integrates all possible solutions that makes a seamless supply of food products, while ensuring its nutritional status.

Though Saudi Arabia has a number of geo-climatic limitations and problems, agriculture definitely has immense potential for contributing towards sustainable food security. Towards this the agricultural industry need to make required investments in technology that is capable of promoting a “market-oriented agriculture” that enhance productivity so as to derive the maximum possible income from each unit of water used. The system should be such that it is can bring in better incentives to farmers, and save as well as generate foreign exchange earnings. In order to attain this, there is the requirement of careful analysis and identification of the right mixture of crops and trade-offs (Table 3).

The suggestions based on the findings of the study are presented in Table 3.

Table 3. Suggestions

No	Suggestions	Details
1	Developing of sustainable and resilient agriculture	<ul style="list-style-type: none"> • To make the agriculture sustainable, problems associated with soil quality and climate change need to be addressed with top priority. • This requires a holistic approach that comprehensively takes into consideration aspects related to: <ul style="list-style-type: none"> ○ Land management ○ Water management ○ Crop management ○ Economies of size (financial management) ○ Information management
2	Research and extension activities to boost productivity	<ul style="list-style-type: none"> • Productivity needs to be provided the top priority, as the availability of arable land is a big issue. • There is a definite requirement for research and extension activities towards enhancement of productivity. • Extension activities of various institutions including research organizations, universities, and government bodies need to be streamlined, networked, and organised in a seamless manner. • The various research bodies (both private and public) need to be networked so as to have knowledge and experience sharing.
3	Adoption of latest farming	<ul style="list-style-type: none"> • For productivity enhancement, all famers need to be sensitized to adapt

	technologies	<p>modern farming techniques</p> <ul style="list-style-type: none"> • Incentivizing and appropriate rewarding of technology adoption by progressive farmers. • Appropriate policy frameworks towards adoption of latest farming technology will act as a “push factor” in this direction.
4	Multi-cropping	<ul style="list-style-type: none"> • Multiple drought resistant crops could act as a cushion against recurrent losses for the farmers. • This will act as a hedge against crop losses and help in maintain the fertility of the soil.
5	Supportive institutional framework	<ul style="list-style-type: none"> • The financial institutions need to be sensitized and appropriate schemes devised for making available timely and easy accessible seasonal finance. • Adequate focus should be provided to small, marginal and medium farmers, which could act as a “pull factor” in favour of them.
6	Price stabilization mechanisms	<ul style="list-style-type: none"> • Due to various contingencies farmers have to face wide fluctuations in prices. • An institutional early warning and price stabilization mechanism need to be in place so that price variations do not take the farmers by surprise. • Availability of adequate and appropriate storage facilities could be a major step in this direction. • Financial support for small farmers, including subsidization would go a long way in the direction of food security.
7	Water efficiency	<ul style="list-style-type: none"> • The region being water stressed, water efficiency need to be given top priority. • Crops that require lesser amount of water need to be identified and prioritized, than those which require larger quantities. • Water efficient techniques and technologies need to be made available to all farmers irrespective of type and size. • Wastage of water need to be reduced considerably and could even be made an offence. • A policy framework and a popular movement towards water conservations need to be in place, as presently this resource is taken for granted by the farmers.
8	Efficiency throughout the supply chain	<ul style="list-style-type: none"> • There is need for efficient storage facilities of various agricultural produces. • Efficient supply chain could go a long way in substantial reduction of post harvest losses, which currently is at disproportionately higher levels. • This will also solve the problem of availability and accessibility of required food for all the sections of the society, irrespective of their location and demography.

6. Conclusion

Maintenance of sustainable food security is a universal concern. This requires robust policies that take into consideration diverse views, feedback and opinion from various stakeholders. This will help in boosting and accelerating agriculture. The present work was an attempt to understand the prevailing status of agricultural prospects in Al Kharj. The study has been confined to small and medium farms located in Al Kharj. This could be a limitation as large corporate farms have not been brought under the purview of the study. However, since the researchers, have provided due consideration to all the problems faced by the small and medium firms, the limitation would not be of significance. However, further researchers could attempt to explore the possibility of identifying the problems of large corporate farm houses, in addition to involving other stakeholders. Since the *Vision 2030* is focusing on enhancing the non-oil sector growth, there are immense possibilities and opportunities for farmers and other prominent stakeholders to collaborate in reforming agricultural practices and policies. There is a definite need to enhance productivity of agriculture in the kingdom. Partnering with global experts in agriculture will give the country open up the floodgates of avenues in this field. It is expected that the present work will act as a trigger in motivating further studies in this challenging area.

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