Journal of SECURITY AND SUSTAINABILITY ISSUES
International Entrepreneurial Perspectives and Innovative Outcomes

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Dear readers,

Today I have an opportunity to introduce to your attention the tenth, the jubilee issue of the Journal of Security and Sustainability Issues (2013, Volume 3, Number 2).

This issue is very important to the Military Academy of Lithuania, the publisher, for two reasons. The first reason is, as I already mentioned, the journal celebrates its first anniversary – the tenth issue is published. I am very glad to state that the issue I am introducing is devoted to the 12th International Entrepreneurship Forum Conference, which was held on September 4-6 in Vilnius. The conference was jointly organized by the University of Essex (UK), OECD and The General Jonas Žemaitis Military Academy of Lithuania.

I am delighted that our partner, International Center for Entrepreneurship Research of Essex Business School, looks at entrepreneurship through the lens of security. Security of the country is a fundamental need for every nation, which embraces a wide range of activities. Besides its very directly perceived core functions, the Military Academy of Lithuania pays special attention to the analysis of societal processes, which ultimately might trigger any form of insecurity. Hence, as the Military Academy of Lithuania, we foster scientific activities, perform a variety of relevant analysis and contribute to the development of sciences. We strive that our highly trained and educated people were at the hub of international events and shared, contributed and perceived contemporary phenomena. Timing of this conference carried much more resonance and symbolism as it was held during the Lithuanian Presidency of the Council of the European Union. Lithuania started a journey from regained statehood to full-blown membership of the European Union, a journey that all of us undertook. Today, Lithuania returns to the Parliament proud of the path it has taken, confident of its European choice and ready to put all its effort into building a European consensus for a better, stronger, and more united and secure future together. Each institution is responsible for the taken path. Here special role belongs to the Military Academy of Lithuania.

Sincerely,

Commandant Colonel EUGENIJUS VOSYLIUS
The General Jonas Žemaitis Military Academy of Lithuania
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The presented paper aims to discuss new Lithuania’s role in taking presidency of the EU and to evaluate Lithuania’s development process. State of Lithuanian economy is being presented; aims of further development are identified. The context of other European countries is being taken into account. Authors rely on critical analysis of contemporary scientific literature and comparative statistics. Among driving forces affecting process of economic development investments of foreign origin and increasing level of education are being distinguished. Insights considering a role of the latter driving forces are being offered.

Keywords: secure and sustainable development, Lithuania’s Presidency, investments, education

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JEL Classifications: O10, O11, O15

1. Lithuania in a new historic role in pursuing secure and sustainable development

Contemporary the EU agenda captures the acute issues Europe is currently facing: those of economic security, social sustainability, or put in other way, secure and sustainable development becomes an ultimate aim we pursue. The financial and economic mess that started in 2008 threatens Europe’s economic security to this day, and it does not matter which factors you believe are to be blamed for the crisis: whether it’s excess bank lending and risk taking, loose central bank regulation, which neglected the exploding bank balance sheets, or governments, some of which borrowed excessively and lived beyond their means. All these have one thing in common: they are examples of unsustainable actions.

However, historically, Europe has been the most united in times of crises. The greatest manifestation of this is the signing of the Treaty of Rome in 1957, in the midst of the cold war. After two world wars we as a continent have realised that only sweeping changes could prevent a new conflict. It was this treaty that created the Europe that we live in today – peaceful, democratic and prosperous. The on-going economic crisis threatens this order and is once again demanding radical changes, and rightly so. Europe has al-
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Secure and sustainable development: Lithuania’s new role in taking the presidency of the EU

ready chosen the path of cooperation in 1957, and the common belief is that it will remain unchanged. Through cooperation secure and sustainable development is most definitely achievable.

Since its independence, Lithuania has strived for secure and sustainable development. To achieve this, we needed to integrate Lithuania into the international economic and political space, which led to setting membership in NATO and the EU as our highest priorities. And now, after almost 10 years in the European Union, Lithuania has begun its Presidency of the Council of the EU and is determined to steer the union towards sustainability and economic security – the values that we as a country had sought it for from the beginning.

It is worth noting that Lithuania is holding the Presidency less than one year before the new elections to the European Parliament, and this will also be the end of the period of five years for which the European Commission, as well as legislative initiatives by the European Commission, and following up on the decisions taken by the European Council in June 2013 on further strengthening the Economic and Monetary Union. In a view of a better economic performance, Lithuania will seek to facilitate for Member States the implementation of important social and economic reforms.

Growing Europe is another priority of the Lithuanian Presidency, and it will be built on the Europe 2020 agenda, making sure that attention is given to the implementation of Compact for Growth and Jobs. Even though the economies of the Member States have undergone structural transformation and gradual restoration of lost competitiveness, the consequences of the financial crisis are still very tangible. This is especially evident for the complicated social situation in some Member states, given high unemployment and slow economic recovery. We will focus on further deepening and integrating the Single Market, including the energy sector, as the main force for economic growth and better employment opportunities.

The MFF agreement foresees increased funding for competitiveness and employment, in particular for research, youth education and employment, as well as the development of transport, energy and telecommunications networks. Taking into account the ever more acute consequences of long-term unemployment and growing social exclusion, youth employment will be a priority for the Presidency. Lithuania will take every step required for the implementation of the youth employment package, with a special focus on implementation of the Youth Guarantee Initiative and encouragement of apprenticeships. With regard to the promotion of social inclusion, Lithuania will encourage the implementation of the Social Investment Package, with a special emphasis on investment in children. Discussions on these topics will be organised in the Council. Better protection of worker rights, including the protection of migrant
workers, will also be included in the list of priorities for the Presidency.

In order to achieve secure and sustainable development, short-term measures to increase the competitiveness of the EU economy must be developed with due regard to long term competitiveness perspective. This can be achieved through a greener economy, renewable energy and better use of natural resources, allowing the safeguarding of growth potential in the future. The Lithuanian Presidency expects to take up and complete on-going negotiations regarding transit measures for the Common Agricultural Policy.

We cannot fail to mention the energy security issues that are of particular importance to the Baltic States. We still remain energy islands within Europe. While we are Europeans in politics, law, economy and culture, we remain dependent on Russia in energy. True, power bridges to Sweden and Poland as well the construction of a liquefied gas terminal could resolve these issues, yet today our competitiveness and sometimes even domestic politics are negatively affected by the high costs of energy resources imported from a sole source, Russia. This is why Lithuania will actively work on the Internal Energy Market. Once established, this will provide a significant impulse for an effective Single Market and the entire EU economy. The EU has set an objective to establish the internal energy market by 2014, and eliminate the energy isolation of certain member states by 2015. Therefore, acting in concert with the European Commission and the Member States, Lithuania will seek to strengthen the implementation of the commitments by the Member States in this field, with particular focus placed on the Third Energy Package and issues of market design, infrastructure and renewable energy resources. In November 2013, Lithuania is hosting a high-level conference, concentrating on relevant issues in developing a modern EU energy infrastructure, and discussing the first list of energy projects of common interest.

Open Europe - The start of the Lithuanian Presidency was symbolically marked by the accession of the Republic of Croatia – the 28th Member State. During the Lithuanian Presidency, the EU Council will set the EU Enlargement policy guidelines for 2014, where Lithuania will seek to ensure a continuous enlargement process based on principles of own merits and clear conditionality.

In a broader sense, the EU competitiveness, sustainable economic growth and jobs can be safeguarded, provided that the EU citizens feel safe, and that the EU institutions remain active in their protection of fundamental human rights both within the EU and abroad. For this purpose, the EU, acting through concerted effort of the Presidency and the EU institutions, has to promote further democratic principles in the neighbourhood, ensure regional stability, openness for trade, promote interpersonal contacts and development aid, and together with international partners tackle global challenges.

This is why must also not forget our neighbours in the Mediterranean region and Eastern Europe. We cannot be indifferent to the spread of European ideas outside the EU borders. Our eastern neighbourhood is a living laboratory of the same European idea. Lithuania expected that an Association Agreement with Ukraine would be signed during the Eastern Partnership Summit in Vilnius this November. Alas, this aim, seems, to be postponed.

Despite all the difficulties after 2 years of the recession, our country returned to growth, and while the euro area is mired in stagnation, Lithuania has once again emerged as one of the fastest growing economies in the EU. Its GDP grew by 3.7 % in 2012, following a 6 % growth in 2011 (Fig. 1).
According forecasts of Ministry of Finance of Lithuania, the economy is expected to expand again by 3% in 2013. During the crisis, we took tough decisions to ensure sound public finances. Fiscal tightening measures produced a budget balance improvement totalling about 12% of GDP between 2009 and 2010. Our budget for 2013 is on track for the target deficit of approximately 2.5%. This was achieved without external help from organisations such as the IMF. Furthermore, the government debt was at 40.7% of GDP at the end of 2012 – the sixth smallest among EU member states. It is no surprise that the international rating agencies such as Moody’s, Standard&Poor’s and Fitch rate Lithuania above most of its Central and Eastern European peers (Fig. 2).
Economic recovery was in a large part helped by flexible labour force. A drop in unit labour costs led to enhance competitiveness gains and laid the foundation for an export-led recovery. Lithuanian unemployment rate is now decreasing and is projected to continue that way in 2014 (Fig. 3).

The recovery success story leads us to the next big milestone for Lithuania: European currency - the euro. We intend to adopt the new currency as soon as we meet the Maastricht euro convergence criteria – currently the target year is 2015. Once this is done, the final step in integrating our country into Europe will be complete. But the work never ends, and it has to be emphasized that Lithuania seeks social and economic sustainability by integrating itself not just into the European, but the world economy as well. We are planning to open talks with OECD in 2015 aiming to join the organisation as soon as possible.

Let me assure you, economic growth and social inclusion are not just the European buzz words for us. Economic growth and social inclusion has been and will be a priority for the Government of Lithuania in the coming years. We have agreed on the national goals for economic and social growth by approving the National Development Programme 2014 – 2020. This document is a roadmap for growth uniting the institutional efforts and financial resources, including the EU financial assistance. Moreover, we have approved Government priorities for 2013 and 2014 which spell out very specific actions and projects that our ministries and other institutions intend to carry out in the coming years to support the achievement of economic and social priorities.
Employment, competitiveness, business environment, science and innovation, social inclusion and regional development will be our main directions for work and action. In order to move toward indicated targets and foster secure and sustainable development in Lithuania and other countries appropriate economic policy is needed. Design of such policy is seen as a process rather than an act. Hence, analysis of driving forces and their performance in different conditions stands as key target and aim of scientific analyzes. Investments both domestic and, especially, foreign are seen as fundamental factor accelerating economic growth. The high level of education, which serves as competitive advantage of Lithuania has to be exploited more intensively and efficiently. Anyway, impact mentioned and not mentioned here driving forces of secure and sustainable development remains an important object of ongoing scientific investigations.

2. Driving factors of secure and sustainable development: investments and education

In order to achieve a set of goals indicated above, a general and sustainable path leading to secure and sustainable development has to be maintained. Secure and sustainable development can be achieved through acceleration of economic growth, which has its driving forces. There are a lot of theories of economic development (e.g. Vosylius et al.). Research of economic growth causes and their outcomes comprise an area of economic science, which will remain urgent for many decades or even centuries. Despite intensive discussions about forces of economic growth and significance of their impact on GDP growth, importance of investments remains unquestionable. Investments can be of different origin: local and foreign. In macroeconomics and comparative economics dealing with an array of theories if economic of growth, it is in principle unanimously assumed assumed that major driving forces of secure and sustainable development are investments and la-
bour force. Investments have their sources. The main source is local private investment, which is very much related to savings’ level. Of course, public investments are very important as well, but their source is state budget, which, in its turn is directly dependent on economic growth and, respectively, is partly conditioned by private investments, which come from savings. Having in mind, that it is rather difficult to increase level of savings in any country, investments of foreign origin are being emphasized. Globalization processes, which are very much related to movement of capital, facilitate channelling investment from one country to another. Expectations, related to inflow of foreign capital especially boosted interest in that phenomenon already in 1990’s. The issue of foreign capital attraction and consequences of inflows of foreign capital have remain an urgent issue (e.g. Adewumi 2006; Sahoo 2006; Šimelytė, Antanavičienė 2013).

As it was already mentioned, the role of foreign direct investment (FDI) gained significant importance during the 90s as a tool for accelerating growth and development of economies. In the 9th decade of previous century positive effects of FDI were especially emphasized. One of the most prominent scientists of that time was Dunning (Dunning 1997; Dunning, Narula 2002) He introduced a concept of the investment development path (Dunning1997). If to rephrase his ideas, FDI intensity depends on level of countries development. The more country develops, the more FDI it receives and, at the same time, invests abroad (Dunning and Narula 2002). Despite cited ideas are not very novel, it seems, the insights preserve their value and are valid in contemporary conditions (Tvaronavičienė, Lankauskinė 2011; Tvaronavičienė et al. 2013). FDI inflows into Lithuania remain much lower comparing to develop the EU countries, e.g. Austria, Belgium, Netherlands (Tvaronavičienė, Grybaitė 2013), most likely because of differences of development level.

Despite controversial estimation of impact of FDI on host economies at various countries in different stages of their development (e.g. Busse et al. 2007; Tvaronavičienė et al. 2009; Tvaronavičienė, Kalaisnkaite 2010; Lankauskienė, Tvaronavičienė 2011; Tvaronavičienė, Lankauskienė 2011), initiating of inflows of foreign capital stands a priority of economic policy of Lithuania. Here we need to put emphasis that each case, especially related to strategic investments is context sensitive, and direction toward FDI attraction is not unconditional. Nevertheless, the direction itself remains clear enough: additional capital inflows are seen as important driving force of secure and sustainable development of Lithuania.

This aim, we believe can be achieved through improving business conditions in the country. Despite a lot of indicators, reflecting business environment can be listed (e.g. Tvaronavičienė, Grybaitė 2012), tax burden remains an important characteristic of business environment among all other indicators. Lithuania exhibits the lowest total tax burden at 26.0 % of GDP (including social contributions) in the EU. Compared to the two other Baltic countries the Lithuanian tax-to-GDP ratio is close to that of Latvia (27.6 %), but 6.8 percentage points lower than the one of Estonia (32.8 %). In terms of revenue structure, Lithuania relies most on indirect taxes (11.9 % of GDP and 45.6 % of total taxation). VAT revenue in GDP terms has been stable at 7.9 % in 2010 and 2011 while revenue from excise duties and consumption taxes decreased during last two years (from 3.5 % in 2009 to 3.3 % in 2010 and further reduction to 3.1 % in 2011). At the same time, the ratio of direct taxes to GDP continued to decrease for the fourth year in a row (9.3 % in 2008 to 4.4 % in 2011) leading the country to have the lowest share of direct taxation in the EU-27 (Taxation. Country Chapters). Low tax burden, we believe, serves as indicator of favorable business conditions for both, local and foreign market players, hence make Lithuania more attractive capital destination in comparison with other countries.

Quality of human capital cannot be overestimated. Efficient adoption contemporary technologies have to be paired with increase of education level, otherwise a country can finish with underused equipment and facilities. Education level rises in all countries, and Lithuania is found among leading countries in that respect (Fig. 4). Another issue is, which is being tackled now: increase level of employment of youth in aging society and prevent emigration of qualified labor force to better economically developed countries.
3. Concluding remarks

Lithuania is the first Baltic State taking over the EU Council Presidency. Creation of favourable conditions for long-term secure and sustainable development of Europe, restoration of confidence in economies of European countries serve as several goals out of list, which additionally tackles diminishing of unemployment, especially among youth, supervision of banks, diminishing energy security issues.

Secure and sustainable development can be facilitated or hindered by economic policies, devised by countries. Among a variety of driving forces of economic development, investments, and where appropriate, investments of foreign origin are emphasized. High level of education of Lithuanian labour force has to be better employed in order to accelerate secure and sustainable development of host country.

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TOWARD SUSTAINABLE DEVELOPMENT OF ECONOMIC SUB-SECTORS: 
CASE OF INDIAN SERICULTURE

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Abstract. Agricultural extension services being provided predominantly by public agencies in the developing world have contributed to quantum jumps in food production in countries like India. However, these services have failed to eliminate persistent structural poverty among a significant proportion of the farmer households. Part I of the paper summarizes generic problems that have so far persisted in the provision of agricultural extension services in various developing countries (including India) as given in the published literature. It then brings out various elements of the reform processes that are being recommended and implemented in developing country programmes by various donor agencies, like the World bank, FAO, GTZ, etc.

Part II of the paper carries out in brief SWOT analyses of the Indian silk industry. It also highlights the organization and functions of the various infrastructure of the central and state government agencies providing extension services for the sericulture industry. It then critically examines as to how this infrastructure and services are geared to mitigate the weaknesses and threats and exploit the strengths and the opportunities of the sector. Based on this the framework of extension services reforms outlined in Part I of the paper is applied to formulate recommendations on the reorganization of this infrastructure for its better cost-efficiency and effectiveness.

Keywords: Rural technology systems, agricultural extension, sericulture, India, Central Silk Board, strategic lacunae

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JEL Classifications: O3, O13, O15

PART I: APPROPRIATE TECHNOLOGY DELIVERY SYSTEMS – A REVIEW

Introduction

India’s population in 2011 was over 1.21 billion representing 17.31 per cent of world’s population, increasing from 1.02 billion in 2001, a growth rate of 17.64 per cent (Census of India, 2012). Going by the current population figures and the growth rate in population, the population of India is expected to cross that of China by the year 2030 (Indiaonlinepages.com, 2012). While India’s population growth rate has been more or less steady over the last four decades and even declined over the last decade, the working age (15 yrs. to 59 yrs.) population has in-
creased from 227 million to 350 million to 380 million (that is, from 52% to 55% to 62%) between the years 1971, 1991, and 2000, respectively. (World Bank, 2002). It is estimated that currently about 50 per cent of India’s population is below the age of 25 (Indiaonlinepages.com, 2012). According to a past estimate, India’s overall ratio of rural poor to urban poor had increased from about 1.08 in the 1990 to 1.4 in the year 2000 (Datt and Ravallion, 2002).

Strategic investments are required for alleviation of poverty among the rural agricultural households. The direct anti-poverty programmes of the government may have temporarily helped the poor in getting food, etc., but have failed to raise their capacities or productive assets for earning higher incomes on sustained basis (Mukherjee, 1995).

In India the volume of investment has been increasing during the successive Five-Year Plan periods. But the use of increased capital has been considered to be either below potential and/or inefficient resulting in a commensurately low level of output – an indication of the slow rate of technological progress in the Indian agricultural and industrial economies (Thimmiah, 1990). It has indeed been shown that additional government spending on technological up-gradation in agriculture (research and extension) has the largest impact on agricultural productivity growth, and it also leads to large benefits for the rural poor (Fan et al, 1999).

Moreover, the agriculture sector in developing countries like India are faced with several additional challenges: maintaining the food security, declining cultivated area due to population pressure, declining agricultural productivity due to soil and natural resource degradation, and increasing competition in the globalised markets. One fundamental element in meeting the challenges of the structural poverty and resource pressure is therefore raising the productivity of the land through diffusion of new technologies. This transition from a resource-based to a technology-based system of agriculture places great importance on the technology generation and extension system, being the vital source and channel of transferring the new technologies to farmers (Umali and Schwartz, 1994).

The paper probes into the rural extension service scenario in India and presents a case study of sericulture sector in India to identify the strategic lacuna in rural technology delivery systems.

Managing Transfer of Technologies for use in Rural India – A Strategic Perspective

Technology transfer could be considered to be the process by which technological innovation efforts initiated in different bodies and institutions fructify, get commercialized and contribute to the national economy. This process is not an isolated one and cannot be managed as such. However, the management of the transfer of technologies including those that are developed for use in rural and semi-urban areas is an integral component of the management of the technological innovation process. This underlines the idea that forms of technological cooperation are no longer one way but involve a longer-term mutual benefit beyond a short-term commercial success. Andersen and Lundvall (1989) have pointed out that ‘learning by interacting’ through technological networks has become as important as the traditional ‘learning by doing’ as the source for new innovations.

In an earlier study, Roy (2001) had highlighted the importance of adopting the strategy of networking in the management of innovation of technologies suitable for adaptation and use in rural India. He has presented two case studies of technology development efforts for desalination of brackish and saline water for drinking and other purposes undertaken in a particular laboratory functioning under the Council of Scientific and Industrial Research (CSIR), namely, the Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar. The case studies highlight that the issue of management of transfer of such technologies goes much beyond the immediate and should take into account a whole gamut of environmental factors including government legislations as well as a whole range of economic as well as socio-cultural parameters. Planning in such a framework should elevate from the piecemeal to the integrated, which necessitates the framing up of a policy perspective for the planning process for such technologies.

Problems in Delivery of Agricultural Extension Services

In India, as in most developing countries, agricultural extension programmes of the central and provincial governments remain the dominant mechanisms for technological transfer and diffusion in agriculture. These programmes have no doubt led to quantum jumps in agricultural productivity in major cereal crops in irrigated agriculture regions. However, there
have been a number of persistent problems with the agricultural extension system in India that have hampered its effectiveness in widespread agricultural development and alleviation of rural poverty. These problems, as brought out in literature have been summarised below:

**Bureaucratic structure**

For example, it has been found (Macklin, 1992; Rivera, 1996; and Thimmaiah, 1990) that: (a) Extension bureaucracies have developed with top-heavy and top-down approach; (b) The functionaries have revealed a bias in favour of richer farmers, as against the socio-economically weak and deprived; (c) The households located in remote inaccessible villages are conveniently neglected by the field functionaries; (d) The infrastructure, taken as a whole, is inefficient, lacks adequate resources and is spread too thinly; (e) Uniformity of instructions, preventing any flexibility in adaptation and innovation at the local level, and therefore irrelevant in many cases; etc.

Reviewing agricultural extension systems in developing countries, Rivera et al (2000) found that “government extension systems are ineffective and inefficient and have been too monolithic, heavy handed, and controlling. There is concern that governments have created extension bureaucracies that are overstaffed, have little funding for operating expenses, use unsustainable approaches, and are overly supply-driven”.

**Underdeveloped Services Sector**

Agricultural production is closely tied to upstream factors (namely, supply of inputs, credit, technical knowledge and training, etc.) and downstream factors (storage, marketing information, access to markets, transport, processing, etc.) and depends on adequate access to resources, goods and services. Thus, agricultural production and product processing and the services that accompany them function interdependently in economic terms. A list of key agricultural services would include (Dresrüssë et al, 1998; GTZ, 2000):

(i) Agricultural (technical) extension and information services,
(ii) Education and training,
(iii) Rural financing (saving, credit) and insurance,
(iv) Provision of market information, marketing links, and market promotion,
(v) Input delivery services for plant/animal production (seed/genetic material, fertilisers, pesticides, irrigation water, machines/implements, etc)
(vi) Regulatory services (testing and certification of seeds and products, quality control),
(vii) Provision of social and technical infrastructure (transport, test centers, common processing facilities, markets, etc).

However, the extension services in India covers only the technical information and training [(i) and (ii) above]. Training and Visit (T&V) model of extension system followed in India does not cover farm input and credit supply. The provision of other services has remained largely underdeveloped, being partly and uncoordinatedly covered by the trader, and a multiplicity of line departments of the government agencies (Macklin, 1992; Feder at al, 1999). Thus there exist systemic gaps in the comprehensive provisioning of various agricultural services, hampering growth in agricultural productivity.

**Fiscal deficits and Cost-inefficiency**

Many developing countries, including India, have for years found it difficult to make adequate resources available for agricultural extension and other related services. For some countries, recent structural adjustments have exacerbated the situation. In India, some 20% of village extension posts are vacant at any given time, mostly in the more remote areas. About 80% of the extension budget is spent on salaries, with minimal funds for extension operations (Farrington, 1994). Thus the extension infrastructure functions sub-optimally with low returns on the investments made for extension provisioning.

**Extension Reforms**

Given the pivotal role they have in enhancing the productive potential of agricultural economy and for alleviation of rural poverty, agricultural extension and rural information and advisory services are likely to intensify in the foreseeable future. However, the above difficulties demand a reform of the present structure and approaches to agricultural extension. Issues regarding extension reform have been analysed in great detail by a number of experts. The related key issues, as brought out by a number of experts based on implemented reforms in a number of developed and developing countries are summarised below (Umali and Schwartz, 1994; Umali-Deininger,
Improving Extension Management

The World Bank sponsored Training and Visit (T&V) system of agricultural extension was implemented in 76 countries, including India (late 1970s). The system stressed that certain key featured had to be preserved – professionalism, a single line of command, concentration of efforts, time bound work, field and farmer orientation, regular and continuous training, and close links with research. However, the T&V system too has not escaped some drawbacks, for example: unaffordable staff and operational budgets, neglect of poorer/remote farmers, dependence on other rural development programmes, neglect of beneficiary participation in planning and monitoring, and accountability to farmers. However, other reforms, discussed below, related to single commodity focus, concentration of efforts in more potential areas, decentralisation, and partnership with private, non-governmental and farmer organisations in delivery of services can effectively mitigate the said disadvantages with the T&V system.

Decentralisation

Decentralisation includes administrative and political-fiscal devolution of programmes, funding decisions, and staff accountability to local agencies. The effectiveness of decentralisation depends on the extent to which the central and provincial governments actually devolve fiscal and decision-making powers to the local democratically elected government. It also depends on the revenue raising abilities of the local government.

Effective decentralisation would help building local capacity for beneficiary participation in planning and monitoring, replacing the top-down approach and employing locally suited programmes. It also allows better coordination with other development programmes administered by local bodies.

Single Commodity Focus

Many public agencies (like the Central Silk Board, Rubber Board, Coffee Board, etc, in India) focus on one commercial or export crop, or one aspect of farming, such as dairying or livestock. The distinctive feature of the commodity specific extension lies in vertically integrating services for most of the components of the production and marketing systems, including research, input supply, running common facility and testing infrastructure, product marketing, credit, crop-insurance and minimum price assurance. The single commodity focus can potentially achieve cost-effectiveness, through levies on product sales, or by factoring cost-recovery into product or input prices.

As an alternative model, agro-processing, or input supplying firms provide extension services to their farmer-clients to reduce input supply risks, reduce post harvest losses, and improve quality, quantity, and timeliness of output. Umali and Schwartz (1994) have documented a number of examples of farmers’ associations and cooperative commodity ventures which provide extension services to its members.

Paid Extension Services

Some government agencies charge a fee for services to recover part of the costs. The government bears the remaining expenses for the services. This contributes to fiscal sustainability, accountability, and more professionalism and client-orientation. However, paid service extension is likely to exacerbate the generic problem of non-coverage of lower-income groups; this may also clash with political commitments for free services. Stratifying the client market by income level, and requiring progressively greater cost-sharing by higher income groups reduces both generic fiscal and liability problems, and releasing public resources for an ‘extension safety net’ targeted at low- to middle-income producers in priority areas. The for-fee extension services have been implemented in Mexico, New Zealand, UK, etc.

Plural Service Provision – Redefining the Role of Public Agencies

Involving a variety of stakeholders through contracts and collaborative partnerships for providing a range of extension services helps resolve problems of accountability or incentive to deliver quality service. One of the ways to get around this is subcontracting that ‘gets around the institutional inefficiencies associated with public delivery’ (Umali, 1997). Involving nonprofit NGOs may further improve responsiveness, cost-effectiveness, and equity in coverage.

Several principles underpin innovations in this category. First is delinking public funding from public delivery. Second, a key governance principle is to open and democratize extension control so that all
stakeholders may express their perspectives and interests, and play appropriate roles in extension design, implementation, and evaluation.

Third, with pluralism the government recognizes that to meet diverse needs and conditions in the farming sector, it should invest more broadly in the whole agricultural knowledge and information system, rather than in public sector extension services alone.

Yet another problem arises in federal governments where both a central government ministry, agency or R&D body as well as the provincial public bodies have roles in development of the same sector. In such cases (in India a number of sectors, including agriculture, sericulture, etc. are in the Concurrent List of the Indian Constitution), there appear problems of overlapping functions, lack of coordination, and invariably loss of synergy of efforts and wastage of funds. In such cases, only technology generation and transfer to state bodies and training of trainers (drawn from the provincial extension agencies, NGOs, etc.) should be retained by the central agencies. Implied in each of the above principles are significant role changes for government ministries/departments of agriculture or commodity specific agencies as they move away from service delivery toward providing an enabling policy environment, coordinating and facilitating the work of other players (emphasis original).

Recognizing that complete privatization of agricultural extension services is often not feasible, developing countries around the world have tried diverse innovative methods to address problems of fiscal sustainability and poor client orientation by integrating the private sector into extension systems. In such cases the government retains a role not only in (part) financing, but also in regulating extension providers. The methods include: subcontracting of extension services, coupons attached to agricultural bank loans committing a certain percentage of the loan for extension services, collaborative arrangements with the NGO and nonprofit sector including cooperative arrangements with universities, commodity boards, and commodity cooperatives or associations (Umali and Schwartz, 1994; FAO, 1997).

**Beneficiary participation and empowerment**

Evolving control by and participation of beneficiaries has positive effects for most of the generic problems of extension: (a) problem of scale and coverage is solved by grooming farmer leaders with appropriate local backgrounds, including women, who are able to perform many extension agent roles in a cost-effective manner; (b) complementary services are tuned more closely to farmer needs; (c) farmer dependence on external inputs is reduced; (d) fiscal sustainability and cost-effectiveness is improved through mobilizing local resources and using relevant methods that focus on expressed farmer needs; (e) interaction with technology generation is improved through feedback into the research system.

Some decentralized, cost-recovery, subcontracting, and cofinancing arrangements followed in a number of countries compulsorily require farmers’ groups as beneficiary organizations. Elsewhere, farmers’ associations organized on commodity lines actually provide extension services to their members (Umali-Deininger, 1996). Chamala and Shingi, (1997) have found that commodity-based farmers’ organizations have been highly successful in the dairy industry in India. These groups pay great attention to monitoring and self-evaluation, have a significant impact in raising the level of trust, understanding, and links among the various actors and agencies involved in a rural situation.

**Privatization**

The private sector has the incentive to provide information and services to ‘better-off’ commercial farmers and members of private associations for whom extension service delivery is profitable. Input suppliers also have strong incentives to provide advice on a range of crop and livestock activities. However, fully privatized extension is not economically feasible in regions with a large base of small-scale, subsistence farmers. In such circumstances, public sector finance remains essential, mixed with various cost-recovery, co-financing, and other institutional partnership arrangements that are appropriate to the pace of structural and commercial changes in agriculture.

All privatization efforts report improvements in accountability, improved efficiency, cost-effectiveness, and reduced public sector costs and dependence on fiscal allocations. Incentives exist for private providers of extension to maintain close links with knowledge generation agencies in order to have a marketable product. However, stratification and separate, publicly-funded targeted programs are needed to counter this risk of neglect of poorer and remote farmers.
In this context, a list of different ways in which an extension service organization may be financed has been given by van den Ban (2000) that offers a useful check-list for the public bodies to consider different financing option for agri-services. According to him an extension organization may be financed by:
1. A government service paid for by taxpayers;
2. A government service paid for by a levy on certain agricultural products;
3. A commercial company selling inputs to farmers and/or buying their products, which in its relationship with its customers also uses extension;
4. A farmers’ association which pays for extension from its membership fees;
5. A farmers’ association which is subsidized by the government;
6. A non-governmental organization (NGO) which is financed by donations from inside or outside the country and/or by commercial companies for public relations purposes;
7. An NGO which is financed by subsidies from or contracts with the government (either the national or a donor government);
8. A consulting firm which charges a fee from the farmers, who are its customers;
9. A publishing firm which sells agricultural journals or other publications to farmers;
10. Different combinations of the above. For example, it is possible for a government to pay the salaries of extension agents, whilst most of the operational expenses are covered by a farmers’ association, or for a commercially-oriented cooperative or input-supply company to send a farm journal to its members/customers.

Harnessing information technologies

Notwithstanding the importance of the more traditional extension methods, such as radio and television, group meetings, field days, demonstrations, and exchange visits, etc., great potential exists for innovative applications of the latest information and communication technologies (ICTs) to enhance extension delivery.

To harness its full potential requires considerable commitment, investments in information and telecommunication infrastructure, and some radical changes in perspective. One change is to lessen the reductionist, sectoral orientation in favor of a pluralist, cross-sectoral, systems perspective of a community – for example, aiming to meet a comprehensive set of information needs of a community, which may relate to health, taxation, long distance telephony, education of children, agriculture, agro-processing, storage, marketing and commerce, various government development schemes, etc. Community communication centers (variously called internet kiosks, telecottages, or, telecenters), exemplify the new partnerships emerging for local information access, communication, and education in rural areas. The ownership and financing arrangements of these telecenters are as diverse in nature as the types of communities they serve, and the type of services they offer.

Experiences and recommendations brought from various parts of the world to a FAO sponsored workshop (FAO, 2000) indicated (among others) the following important considerations necessary for success and sustainability of telecenters:
(a) Broad based and equitable access to ICTs requires as a pre-condition processes of decentralisation, democratization, good governance considerations honouring citizens’ right to information, etc.
(b) A high level “championing” of ICTs education and capacity building of the various stakeholders is required.
(c) Financial sustainability of the telecenters requires investments for both, the supply of diverse information needed by the community as well as for stimulating demand for information through user education and ICT-capacity building.
(d) The employment of particular ICT technology as well as the information content should be decided with community participation, taking into account their language, culture, information requirements, etc.
(e) Beyond physical access, information needs to be timely, retrievable, and easily utilized by a broad range of users, accessible in their own language and consistent with their values.

In India, a number of donor driven (UNDP, ITU, etc) and government sponsored programmes for diffusion of telecenters have been initiated covering many provinces (Shanmugavelan, 2000). Thus a great opportunity exists for the various agricultural services providing agencies to harness the ICT’s potential for meeting their objectives more effectively.
The Indian extension scenario

After following the T&V system of agriculture extension during the period of late 1970s to mid 1990s, and recognizing some of the inherent drawbacks in its efficacies, Indian government launched a reform drive, and the key elements of the reformed extension model currently being implemented in India (World Bank, 1998, as revealed by Ashok Kumar Seth) are being excerpted below:

Decentralization of decision-making. Much of the decision-making will be done at the district level, which, in the Indian administrative situation, is an important element.
- Developing district level strategic extension plans based on participatory techniques in which farmers are involved in assessing their needs, and then building the extension messages around those.
- Getting farmers organized into groups, ultimately into associations. Then looking for a sharing of responsibilities, so that certain functions which have been undertaken by village extension workers, for example, can be taken over by a farmer representative.
- Finding ways and means of withdrawing government’s involvement in input supply activity- so that these activities can be taken over by the private sector, which is beginning to be the case already anyway.
- Bringing the private sector as a partner into the overall scheme and recognizing they play an important role in technology transfer.
- Allowing much more direct interaction between farmer organizations and the private sector without necessarily having it mediated through a public institution.
- Focusing on upgrading the skills of public employees so that they can increasingly play the role of specialist rather than being involved so heavily in much more frontline extension delivery, which can be shared with the farmers and their organizations.

‘Among the innovative ideas of how to bring about this change is to create, at the district level, a body that will take responsibility for the overall planning and management of extension programs. The governing board of a district’s program will include a cross section of persons from public institutions, research, extension, NGOs, and farmer organizations. This body would be registered as a non-profit making society so that the rules of bureaucracy would not apply as strictly.

‘In order to overcome the issue of budget getting lost at the state level, the funds will be allocated directly to that society without going through the state budget. But the fact remains that the society will still be dependent upon public funds. Ultimately the goal is, that if the society is doing a good job of developing the work program and responding to the needs of farmers, it may well be in a position to generate some revenues through the services it is providing. But perhaps more important, is that it will be freer to develop partnerships with the private sector. And some cost sharing elements may begin to emerge through that process.

‘It is a new experiment, therefore it needs to show that it works and is able to effectively deliver on farmers’ needs. Once the credibility of the approach and the system are established, then it will become easier to begin to generate revenue through services provided as well as through developing partnerships with other agencies. But public funding will obviously continue to play a very important role even in the long-term. For a very long time to come in the Indian context, a majority of the budget will need to come from government institutions’.
PART II: THE CASE OF SERICULTURE
SECTOR IN INDIA

Sericulture: An 'Appropriate' Technology for poverty alleviation

Sericulture has the potential to play a dominant role in uplifting the economic conditions of the rural poor. As an agro-based industry, sericulture fits very well in India's rural structure, where agriculture continues to be the main occupation and where farmers are constrained by increasing fragmentation of the landholding. This is because of the following unique features associated with sericulture technology [Patel, 1992, Panda, 1993]:

(a) Labour intensive, capable of developing into a subsidiary family-level enterprise for big as well small landholders (the latter being important for subsistence farmers);
(b) Low investment and quick returns (30-35 day cycle in silkworm rearing);
(c) A huge domestic and international market for raw silk.
(d) The technology is not new to most regions in India, with silk weaving traditions dating back to ancient times and spread over many states; Most Indian states have an established infrastructure and extension support services for promotion of the sector.
(e) Mulberry plant, central to cocoon production technology can grow in almost all types of lands and even in rainfed conditions;

Recognizing the significance of sericulture, the central and state governments in India has taken a series of developmental measures to diffuse the technology far and wide in India through successive Plan periods and also through specific donor-funded projects.

What is Sericulture?

The term 'sericulture' includes the following economic activities: (i) raising food plants (in the form of mulberry plantation') on farms for feeding the silk-worms; (ii) production of disease-free silkworm layings (dfls), eggs, or seeds – a specialized commercial activity undertaken by central and state government agencies and (only in four states) by private licensed seed producers; (iii) indoor rearing of silk-worms till the stage they produce silk cocoons (about 30 day egg-to-cocoon cycle), and (iv) sale of silk cocoons produced. Silk industry, however, consists of (a) sericulture, (b) post-cocoon technology – reeling, spinning and twisting of silk yarn from the cocoons; and (c) weaving, printing and dyeing of silk cloth.

Table 1 presents the details of the commercially exploited sericigenous insects of the world and their food plants:

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mulberry Silkworm</td>
<td><em>Bombyx mori</em></td>
<td>China</td>
</tr>
<tr>
<td>Oak Tasar Silkworm</td>
<td><em>Antheraea yamamai</em></td>
<td>Japan</td>
</tr>
<tr>
<td>Oak Tasar Silkworm</td>
<td><em>Antheraea pernyi</em></td>
<td>China</td>
</tr>
<tr>
<td>Oak Tasar Silkworm</td>
<td><em>Antheraea compta</em></td>
<td>India</td>
</tr>
<tr>
<td>Oak Tasar Silkworm</td>
<td><em>Antheraea proylei</em></td>
<td>India</td>
</tr>
<tr>
<td>Tropical Tasar Silkworm</td>
<td><em>Antheraea mylitta</em></td>
<td>India</td>
</tr>
<tr>
<td>Muga Silkworm</td>
<td><em>Antheraea assama</em></td>
<td>India</td>
</tr>
<tr>
<td>Eri Silkworm</td>
<td><em>Philosamia ricini</em></td>
<td>India</td>
</tr>
</tbody>
</table>

Source: Central Silk Board, India 
(http://www.csb.gov.in/silk-sericulture/silk/)

In the sections below, a brief analysis of the strengths, weaknesses, opportunities and threats (SWOT) that characterize the Indian silk industry has been carried out. The chief characteristics of the organization and functions of the various infrastructural facilities of the central and state government agencies providing extension services for the sericulture industry are then briefly highlighted. It then critically examines as to how this infrastructure and services are geared to mitigate the weaknesses and threats and exploit the strengths and the opportunities of the sector. Based on this the framework of extension services reforms outlined in Part I of the paper is applied to formulate recommendations on the reorganization of this infrastructure for its better cost-efficiency and effectiveness.

The importance of sericulture for India can also be ascertained from the following Table (Table 2) that
lists out the top 10 cocoons (reelable) producers in the world (2005 figures) – India figures at Number 2 in this Table.

**Table 2: Top Ten Cocoons (Reelable) Producers - 2005**

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (Int $1000)*</th>
<th>Production (1000 KG)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>People's Republic of China</td>
<td>978,013</td>
<td>290,003</td>
</tr>
<tr>
<td>India</td>
<td>259,679</td>
<td>77,000</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>57,332</td>
<td>17,000</td>
</tr>
<tr>
<td>Brazil</td>
<td>37,097</td>
<td>11,000</td>
</tr>
<tr>
<td>Iran</td>
<td>20,235</td>
<td>6,088</td>
</tr>
<tr>
<td>Thailand</td>
<td>16,862</td>
<td>5,000</td>
</tr>
<tr>
<td>Vietnam</td>
<td>10,117</td>
<td>3,000</td>
</tr>
<tr>
<td>Democratic People's Republic</td>
<td>5,059</td>
<td>1,500</td>
</tr>
<tr>
<td>Romania</td>
<td>3,372</td>
<td>1000</td>
</tr>
<tr>
<td>Japan</td>
<td>2,023</td>
<td>600</td>
</tr>
</tbody>
</table>

* Official FAO Figures, production in INT $1000 has been calculated based on 1999-2000 international prices

** Calculated Figures

Source: http://en.wikipedia.org/wiki/Silk

A perusal of Table 3 that the raw silk production figures from India with data from the year 1980-81 to 2010-11, it is clear that the production of raw silk in India has been rising steadily.

**Table 3: Raw Silk Production (MT) in India from 1980-81 to 2010-11**

<table>
<thead>
<tr>
<th>Year</th>
<th>Mulberry</th>
<th>Tasar</th>
<th>Eri</th>
<th>Muga</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-81</td>
<td>4593</td>
<td>265</td>
<td>135</td>
<td>48</td>
<td>5041</td>
</tr>
<tr>
<td>1981-82</td>
<td>4801</td>
<td>257</td>
<td>147</td>
<td>44</td>
<td>5249</td>
</tr>
<tr>
<td>1982-83</td>
<td>5214</td>
<td>284</td>
<td>213</td>
<td>37</td>
<td>5748</td>
</tr>
<tr>
<td>1983-84</td>
<td>5681</td>
<td>418</td>
<td>270</td>
<td>54</td>
<td>6423</td>
</tr>
<tr>
<td>1984-85</td>
<td>6895</td>
<td>444</td>
<td>279</td>
<td>55</td>
<td>7673</td>
</tr>
<tr>
<td>1985-86</td>
<td>7029</td>
<td>464</td>
<td>352</td>
<td>52</td>
<td>7897</td>
</tr>
<tr>
<td>1986-87</td>
<td>7905</td>
<td>548</td>
<td>392</td>
<td>55</td>
<td>8900</td>
</tr>
<tr>
<td>1987-88</td>
<td>8455</td>
<td>463</td>
<td>522</td>
<td>58</td>
<td>9498</td>
</tr>
<tr>
<td>1988-89</td>
<td>9683</td>
<td>358</td>
<td>565</td>
<td>45</td>
<td>10651</td>
</tr>
<tr>
<td>1989-90</td>
<td>10805</td>
<td>465</td>
<td>589</td>
<td>57</td>
<td>11916</td>
</tr>
<tr>
<td>1990-91</td>
<td>11486</td>
<td>380</td>
<td>624</td>
<td>70</td>
<td>12560</td>
</tr>
<tr>
<td>1991-92</td>
<td>10658</td>
<td>329</td>
<td>704</td>
<td>72</td>
<td>11763</td>
</tr>
<tr>
<td>1992-93</td>
<td>13000</td>
<td>382</td>
<td>726</td>
<td>60</td>
<td>14166</td>
</tr>
<tr>
<td>1993-94</td>
<td>12550</td>
<td>299</td>
<td>766</td>
<td>76</td>
<td>13691</td>
</tr>
</tbody>
</table>

Sources: Annual Reports of Central Silk Board, India for the Financial Years 1980-81 to 2010-11.

However, as per 2009 figures (Table 4), India’s contribution to world raw silk production was only 15.5% as compared to China’s 81.89% (Varmudy, 2011). It is also clear from the following Table that Mulberry silk forms the overwhelming bulk of all raw silk production throughout the world. It is for this very reason that in this paper the analysis of silk and sericulture refers only to mulberry silk.

**Table 4: World Raw Silk Production (MT) 2009**

<table>
<thead>
<tr>
<th>Country</th>
<th>Mulberry Raw Silk</th>
<th>Per Cent in Total</th>
<th>Total Raw Silk</th>
<th>Per Cent Share of Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>84,000</td>
<td>80.77</td>
<td>104,000</td>
<td>81.89</td>
</tr>
<tr>
<td>India</td>
<td>16,322</td>
<td>82.89</td>
<td>19,690</td>
<td>15.50</td>
</tr>
<tr>
<td>Brazil</td>
<td>811</td>
<td>100</td>
<td>811</td>
<td>0.65</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>750</td>
<td>100</td>
<td>750</td>
<td>0.59</td>
</tr>
<tr>
<td>Thailand</td>
<td>665</td>
<td>100</td>
<td>665</td>
<td>0.53</td>
</tr>
<tr>
<td>Vietnam</td>
<td>550</td>
<td>100</td>
<td>550</td>
<td>0.44</td>
</tr>
<tr>
<td>Korea Republic</td>
<td>135</td>
<td>100</td>
<td>135</td>
<td>0.10</td>
</tr>
<tr>
<td>Japan</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>0.07</td>
</tr>
<tr>
<td>Others</td>
<td>304</td>
<td>100</td>
<td>304</td>
<td>0.23</td>
</tr>
<tr>
<td>Total</td>
<td>103,637</td>
<td>81.60</td>
<td>126,995</td>
<td>100</td>
</tr>
</tbody>
</table>

SWOT Analysis of Indian Silk Industry

**Strengths of the Indian silk Industry:** (a) A large and expanding domestic production base spread over almost all the states exists in India. India’s production of raw silk has grown from 11,486 MT in 1991, about 15,000 MT in 2000-2001, and about 21000 MT in 2010-2011 (Table 3) – currently being number two in the world, next only to China. (b) In spite of stiff competition from mainly China in the high volume, low priced every day wear, readymade markets, India has the ability to offer the high value, low volume items of craft value and having a great variety that have markets in US, West Europe and almost all other continents. (c) About 85% of national raw silk production is consumed by the domestic sari market – offering a steady and assured demand to domestic sericulture and acting as a buffer to international fluctuations in silk industry.

**Weaknesses of the Indian silk industry:** major weaknesses lie in the sub-optimality and skewed productivities in various regions, and a partial dependence on import of the superior bivoltine silk yarn used as warp in the silk weaving industry and export of silk cloth and made ups. In this respect the following is noteworthy: (a) Skewedness in contribution by different practicing states: Whereas mulberry sericulture is practiced in 21 states in India, Karnataka alone contributed nearly 46.4% in 2009-09 and 45.1% in 2009-10 (Table 5). The five traditional states (Karnataka, AP, TN, WB, and J&K) together contribute 96.4% (in 2008-09) 96.7% (in 2009-10) to the total national raw silk production. The mulberry raw silk production in the country is largely multi-bivoltine cross-breed type in contrast to the superior, bivoltine raw silk, which is traded in international markets.

(b) Skewedness in contribution by different practicing districts in each State: The picture of skewedness in the proportion of contribution by states is also repeated in different sub-regions within each state. Statistics (not given here) shows that whereas sericulture is practiced in 20 to 40 districts in each state, 70-90 % contribution comes from 3 to 8 districts only.

(c) Skewedness in Farm Productivity: The cocoon productivity per unit area of mulberry plantation varies very widely among states – from 10 kg/ha in Nagaland to 651 kg/ha in AP (at the gross state level). The three leading states in high productivity are Andhra Pradesh (651 kg/ha), West Bengal (646 kg/ha), and Tamil Nadu (601 kg/ha). What is distressing is that as many as 12 states have unit area productivity falling below 100 kg/ha. These field achievements may be contrasted with the Chinese achievement of 2000-2200 kg/ha.

(d) Weaknesses in the non-farm areas: Half of the cocoon reeling sector (which produces silk yarn) capacity in India is still dominated by the traditional charkha devices, which are characterized by lower quality and productivity in raw silk. At the national level there appears to be an acute shortage of warp quality raw silk (which is partly met from imports) obtainable from the improved cottage basin machines (constituting only 40% of the national reeling capacity at present) and multi-end reeling machines (10%). India is losing precious foreign exchange by importing raw silk, yarn and fabrics (ref: Table 6 below) to cope up with this weakness.

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**Table 5: State-Wise Mulberry Raw Silk Production in India (MT)**

<table>
<thead>
<tr>
<th>State-Wise Mulberry Raw Silk Production (MT)</th>
<th>2008-09</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Traditional States)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Karnataka</td>
<td>7238</td>
<td>7360</td>
</tr>
<tr>
<td>Andhra Pradesh (AP)</td>
<td>4492</td>
<td>5119</td>
</tr>
<tr>
<td>Tamil Nadu (TN)</td>
<td>1411</td>
<td>1233</td>
</tr>
<tr>
<td>West Bengal (WB)</td>
<td>1809</td>
<td>1865</td>
</tr>
<tr>
<td>Jammu and Kashmir (J&amp;K)</td>
<td>102</td>
<td>110</td>
</tr>
<tr>
<td>Sub-Total (A)</td>
<td>15052</td>
<td>15687</td>
</tr>
<tr>
<td>B (Non-Traditional States)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assam</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Bihar</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>5</td>
<td>9.7</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Kerala</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>96</td>
<td>95</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>200</td>
<td>218</td>
</tr>
<tr>
<td>Manipur</td>
<td>96</td>
<td>101.5</td>
</tr>
<tr>
<td>Mizoram</td>
<td>9</td>
<td>16.5</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>2</td>
<td>5.2</td>
</tr>
<tr>
<td>Nagaland</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Orissa</td>
<td>4</td>
<td>8.8</td>
</tr>
<tr>
<td>Punjab</td>
<td>4</td>
<td>5.3</td>
</tr>
</tbody>
</table>
### Table 6: India’s Import of Raw Silk, Yarn and Fabrics (in Million $)

<table>
<thead>
<tr>
<th>State</th>
<th>April-March 2010-11</th>
<th>April-March 2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajasthan</td>
<td>1</td>
<td>1.55</td>
</tr>
<tr>
<td>Sikkim</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Tripura</td>
<td>8</td>
<td>12.5</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>42</td>
<td>60.45</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Sub-Total (B)</td>
<td>558</td>
<td>635</td>
</tr>
<tr>
<td>Grand Total (A+B)</td>
<td>15,610</td>
<td>16,322</td>
</tr>
</tbody>
</table>


### Table 7: Total Export Earnings of Silk Items (in Million $)

<table>
<thead>
<tr>
<th>Item-Wise Export</th>
<th>April-March 2010-11</th>
<th>April-March 2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Silk Yarn</td>
<td>8.65</td>
<td>3.76</td>
</tr>
<tr>
<td>Fabrics, Made-Ups</td>
<td>457.38</td>
<td>194.28</td>
</tr>
<tr>
<td>Readymade Garments</td>
<td>149.98</td>
<td>264.42</td>
</tr>
<tr>
<td>Silk Carpet</td>
<td>4.63</td>
<td>4.01</td>
</tr>
<tr>
<td>Silk Waste</td>
<td>7.93</td>
<td>10.39</td>
</tr>
<tr>
<td>Total</td>
<td>628.57</td>
<td>476.86</td>
</tr>
</tbody>
</table>


### Opportunities:

A supply-short environment of raw silk, increasing demand world-wide, and a relatively developed domestic industry offer great opportunities for growth and expansion of this agro-based industry, and therefore for poverty alleviation in potential areas. This is evidenced from the following trends: (a) The world’s total raw silk production had declined from 95,980 MT in 1993 to 86,812 MT in 1996, and increased over the last decade to 126,995 MT in 2009. There exists an aggregated shortfall in raw silk supply against demand at international level. In the domestic market, the demand exceeds production met by imports from China. (b) The demand for silk goods has been increasing steadily around the world depending on the region of the globe. Apart from the fashionable items of higher value, there has been a great spurt in the production and demand of silk garments of everyday use, sports wear, home textiles, knit-wears, etc., all around the world. (c) The production of raw silk in China has been quite stagnant over the years. (d) India’s export of silk goods contributes significantly to the country’s coffers as per Table 7 shown below. However, the latest trend shows that there has been a slight decline in India’s export earnings in the year 2011-12 as compared to the previous year.

### Threats to the sericulture/silk industry

Threats to the sericulture/silk industry are posed from (a) the post-WTO, liberalized trade regimes whereby cheap raw silk may be dumped in India from countries like China, Brazil, Korea, rendering sericulture unattractive for the farmers; (b) the increasing fiscal deficits being faced by the central and state government promotional agencies threatening the fiscal sustainability their support infrastructure and programmes and services.

### Public Infrastructure for Research and Extension in Sericulture

Sericulture forms part of the Concurrent List of the Indian Constitution. Public infrastructure for promotion of sericulture in India, therefore, exists at two levels: a central agency, namely, the Central Silk Board (CSB), currently functioning under the central Ministry of Textiles; and the state level Directorates of Sericulture.

#### The Central Silk Board Infrastructure

The Central Silk Board was established by an Act of Parliament in 1948 to take control of the then fledgling silk industry. However, with increasing Plan allocations, and particularly after a World Bank aided project (1989-96), its infrastructure has undergone a massive expansion. Currently, it has the following...
units under its direct fold:

I. RESEARCH, REGIONAL RESEARCH & RESEARCH EXTENSION

On-Farm (pre-cocoon) Technologies
- Sericulture Training Schools (13)
- Extension Centres (46)

Off-Farm (post-cocoon) Technologies
- Research Institute (1)
- Demonstration/Training/Service Centres (21)
  (Mulberry Silk–12, Tasar–9, Muga & Eri–1)

II. MASS PRODUCTION OF SILK-WORM EGGS (SEEDS)

- Basic (parental) Seed Production Farms (57) – Mulberry Silk-worm (26), Tasar Silk-worm (23), Muga & Eri Silk-worm (8)
- Commercial Seed Production Centres (27) – Mulberry Silk-worm Seeds (24), Tasar (nil), Muga & Eri (3)

III. INDUSTRIAL SERVICES

- Silk Conditioning & Testing Houses (5)
- Eco-Testing Laboratories (4)
- (Export) Certification Centres (2)
- Common Facility Centre (1)

The State Government Infrastructure

Karnataka and Andhra Pradesh are the only states having their own R&D Institutes for sericulture. The main infrastructure common under each of the state governments (except a few) includes:
- Commercial Silkworm Seed Production Centres;
- Extension Centres for transfer of new technologies, input (eggs, disinfectants) supplies;
- Reeling Training and Farmer Training Schools
- Market Infrastructure for government monitored sale of cocoon and raw silk.

Organization of Infrastructure and Services versus Sector Characteristics

As shown in Table 5, The sericulture development in India has been highly skewed. Whereas five states – Karnataka, Tamil Nadu, West Bengal, Andhra Pradesh, and Jammu and Kashmir (called the traditional states, or TS) – contribute overwhelmingly to the national raw silk production, another 19 states (called the non-traditional states, or NTS) together contribute only a fraction of the total production.

Increasing Plan allocations and the emphasis laid on the sector, and particularly during the implementation of a World Bank (and Swedish Devpt. Corpn.) aided project (1989–1996), the extension infrastructure of the Central Silk Board and the state government directorates expanded rapidly. The infrastructure added included, extension centers, centers for mass production of parental and commercial grade silkworm seeds, technology demonstration and training centers. This also strengthened the CSB research institutes and the regional research stations located in different agro-ecological regions of the country. It is noteworthy that the extension infrastructure under Central Silk Board was added in parallel to that already existing or added infrastructure under the state govs. The spatial distribution of the infrastructure included all the TS and the NTS. The premise was that after an initial and decisive fillip is given for growth and expansion of sericulture, the CSB infrastructure would be taken over by the state governments. However, none of the states have actually taken over the CSB extension infrastructure (barring that the TS have taken over some of the extension centers), as the concerned directorates/departments in the states did not have an assured fund allocation for the maintenance of the same.

The above developments have placed the CSB and the state government directorates in a mix of advantageous and disadvantageous situations from the point of view of the growth of sericulture and the financial sustainability of the extension infrastructure. These have been summarized below:

(a) CSB well placed for technology generation/transfer and advisory role for states: CSB is well equipped for formulation of unified national strategies / policies and Plans, providing consultancy for state-level strategy formulation, providing coordination required for implementation of various state-, national-,
international - level programmes; It also has an ad- equate research infrastructure and has developed a good stock of technology packages (and capacity for transferring them to the states) for higher productiv- ity and quality in the pre- and post-cocoon areas for all regions and seasons. These capabilities are auger well to exploit the strengths and opportunities presented by the international and national silk industries.

(b) Rapid Area expansion but poor linkages: Conse- quent to the World Bank project, CSB, through its own efforts and extension infrastructure, rapidly ex- panded mulberry area plantation in the country (by 25,000 ha). However, after an initial expansion, there was a substantial uprooting of mulberry plantations, particularly in all of the NT states. This was mainly due to the facts that:

(i) The capacity of the state governments to carry on the extension work after the withdrawal of the CSB was not developed.

(ii) The up-market post-cocoon industrial sector, like reeling, weaving, which place demand on the products of sericulture and therefore encourage its growth, was highly underdevelopment, if not absent, in the new areas;

(iii) The new reeling machines developed by CSB and sought to be diffused among entrepreneurs (through the technology demonstration and training centers) for providing up-market demand for sericulture, re- quired high investments and year round supply of raw material to be viable.

(iv) The newer sericulture areas in the non-tradition- al states were mostly rain-fed areas with the farmers mostly practicing subsistence agriculture, and there- fore not in a position to invest in the building and equipment prescribed under the technology pack- age. The regional research stations located in these regions also failed to develop appropriate silkworm rearing equipment which would suit the peculiar characteristics of the local entrepreneurs. This has re- sulted in comparatively low productivities, seriously hampered growth of sericulture and the up-market reeling sector, and contributed to the highly skewed development of sericulture in the country as a whole (Mathur, 1995).

(c) Poor Financial Viability of Commercial Silkworm Seed Production Centers: The commercial silkworm seed production centers (24 in no.) were established to give an initial fillip to the sericulture sector by pro- ducing quality disease free eggs of the developed supe-rior races of silkworm, which form important inputs to sericulture. These centers were mandated to were required to maintain strict financial discipline by re- covering its costs (including establishment, operat- ing, and depreciation of plant and building) through the price mechanism. However, each of these centers has so far been running in a net loss due to typically high establishment expenditures and poor financial discipline associated with public infrastructure.

(d) Duplication of activities between CSB and state di- rectorates: From a comparative geographical mapping of support infrastructure spread over different states and running under CSB and the state level directorates, and from the comments received from the state govt. directorates of sericulture on the utility of CSB infrastructure located in their respective states (partic- ularly in traditional states), it was found that there exists heavy duplication of extension activities – in- cluding production and sale of commercial silkworm seeds, technology diffusion, training of farmers and reeers, etc.

(e) Undue Centralised Bureaucracy and Control within CSB: The CSB’s Institutions, regional stations, and centers (numbering about 400 in total and spread throughout the country) presently operate in an en- vironment of undue control and very limited free- dom. For example, for every item of purchase or ex- penditure beyond Rs.2,000 (till 1999) an Institute or its sub-unit has to seek scrutiny and sanction of CSB HQ. Similarly, all new as well as ongoing research projects being carried out in all the Institutes and stations of CSB are reviewed quarterly by the Head- quarters in spite of the respective Research Advisory bodies. The pre-cocoon research and extension, the post-cocoon research and extension, and the silk- worm seed production organisations of CSB also function in vertically compartmentalized controls – resul- ting in lack of integrated development of various components of the sericulture sector of any region. This invariably results in bureaucratic delays, lack of flexibility required to meet the local conditions, and poor coordination with the state directorates and other local authorities and R&D laboratories.

(f) Poor Sustainability and Development of Partnerships: Serious efforts for development of partnerships in the provision of extension services, and privatization of mass production of silkworm seeds, have not been un- dertaken by either the CSB or the state directorates. In most of the states (except in some of the traditional
states like Karnataka, TN, and AP), even nurseries for the mulberry plants and the young-age silkworms (chauki farms) are owned and run by the state govt. directorates. This has resulted in ever-increasing demands on budgets, very high proportion of establishment expenditures (as much as 70-80%), and serious concerns on sustainability of the support infrastructure.

**Recommendations on Reform of Extension Infrastructure and Services**

The framework and principles that underpin the reform processes of extension services, brought out in Part I of the paper are utilized below to formulate recommendations that are likely to remedy the set of lacunae in skewed development of sericulture in the country, as well as in the organization of the extension infrastructure and services under the CSB and the state government directorates.

(a) **Improving Extension Management**: There is need for better feedback from the field to the research system in case of dry-land regions inhabited by poor farmers, so that proper efforts are made for development of more suitable technology packages. This would lead to better productivities, wider diffusion of sericulture, and help development of up-market reeling sector. Also suitable reeling machines need to be developed which require lower investments and adoptable by poorer entrepreneurs in these regions.

(b) **Decentralisation**: The CSB needs to devolve administrative and financial authority to its regional centers and research institutes. It must allow the regional offices to develop partnerships with state-level governments departments, district and village bodies, NGOs, farmer organisations, entrepreneurs, etc to draw up integrated plans for development of forward and backward linkages. It must also bring about a better role clarity in its functions, namely, (i) It must confine itself to technology generation and transfer to state level functionaries, NGOs, and private entrepreneurs, and divest the infrastructure and extension activities meant for end-beneficiaries. It must also have better coordination and role division with the state sericulture directorates, which are in a better position to understand the local conditions and coordination with the local actors.

(c) **Privatization**: A substantial proportion (50-60%) of silkworm seed production is being carried out by licensed producers in the traditional states. These producers also extend credit and quality control facilities to the sericulturists. However, the balance demand is met by commercial silkworm seed production centers under the CSB and the state directorates. These are inherently unviable financially due to bureaucratic controls and high establishment costs. The production activity (if not the entire infrastructure) must be transferred to private entrepreneurs under suitable incentive schemes and contractual arrangements, so as to maintain quality and production levels, etc. Suitable partnerships can also be developed with them for rendering extension services, etc. (d) **Plural Service Provision and Beneficiary participation**: So far the mentioned central and state agencies have more or less a monopoly in the provision of extension services. Efforts must be made to develop alternative service providers from the NGO, private and cooperative sectors. Sericulture cooperative societies must be encouraged and trained for commercial operation of nurseries, providing extension to their members (perhaps with part financing by the govt.). Synergistic partnerships must be forged with the regional rural banks (and micro-finance institutions), who are spearheading the current movement in formation of credit related self-help groups, for provision of credit and insurance facilities to sericulture cooperative societies. The private commercial silkworm seed and disinfectant manufacturers and NGOs may be provided incentives and partial financing for providing various extension services.

(e) **Harnessing information technologies**: The CSB and state governments must take advantage of the recent spread of telecenters movement in India to develop alternative modes of extension delivery. Telecenters covering information services for sericulture and/or reeling/weaving sectors may be given initial support in the form of capital, information content etc. Internet links to dedicated websites of the government and manufacturers associations can help get instant information on market prices of cocoons/raw silk in urban centers, technology packages, supply of inputs, traders, etc. These possibilities, however have to be explored in conjunction with recommendations on privatization, developing plural service provision, etc.

**Conclusions**

Utilizing the published literature, efforts have been made to synthesize in one place various develop-
ments in extension reforms in various parts of the developing world and as recommended by the International donor agencies like, the World bank, FAO, GTZ, etc. This has resulted in a set of underpinning principles that must guide the reform process for extension services in any agro-sector. Attempt has been made to apply this framework to sericulture sector in India, taking into account an earlier available SWOT analysis for this sector. It is hoped that the set of recommendations formulated for sericulture, along with the reform principles enunciated, would be useful for applications to other agro-based sectors which are facing more or less similar problems.

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THE RELATIONSHIP BETWEEN GOVERNMENT EXPENDITURE
AND PUBLIC SAFETY IN LITHUANIA

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Abstract. This article aims to find how government expenditure for the sectors of defense, public order and safety influence the economic situation and national security in Lithuania. The problem how government expenditure for public safety relates to statistics of national security and economic situation in the country is analyzed in the article. The fundamental aspects of the structure of public expenditure and relationship between major defense, public order and economic indicators are analyzed in the article. Analysis is made using self-made figures and counted coefficients that show the strength of the relation of the analyzed factors. Resulting conclusions give an answer how government expenditure affects economic situation and safety of the country.

Keywords: government expenditure, public safety, productive expenditure, crime

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JEL Classifications: H56, H76, F52.

1. Introduction

Government expenditure has always been a challenge for the government and country leaders. In order to have a balanced budget every country each year has discussions about how to collect revenue, which taxes must be raised and what changes and reforms has to be done. Other discussions, no less than previous, are about the expenditure of the government and depending on a country size it can also be different extent, because different size of a country influence different quantity of expenditure (Senjur 1996). The decisions taken influence which sectors will get more financing, but sometimes these decisions are not taken correctly and fairly, so more financing might be assigned for sectors that need less of it.

Public order and safety is one of the sectors that are financed mainly by the government, so only decisions from the government influence the amount of it. Different governments after elections may change their attitude for this sector depending on the opinion for the safety of the country, and this can be applied for all other sectors. When we speak about public safety it covers not only safety in the streets, but also safety in a region as a country. And this is very important in Lithuania, because our country is at the Eastern border of the European Union, so it is must to have safeguard at the board.

The problem analyzed in this article is how government expenditure for public safety relates to statistics of national security and economic situation in the country, and if this type of government expenditure is really productive: the analysis of statistical data will help to check if government expenditure is productive or not. In order to solve the problem - crime, economic and other statistical data is analyzed. The
The aim of this article is to find how government expenditure for the sectors of defense, public order and safety influence the economic situation and national security in Lithuania. There are few objectives of this article:

1) To reveal the fundamental aspects of the structure of public expenditure;
2) To make analysis of the latest statistics of funding on defense and public order sectors;
3) To find relationship between major defense, public order and economic indicators;
4) To find out how expenditure for public safety affects country’s economic situation.

The methods that will be used in this article are these: systematic socio-economical literature review, analysis of statistical data, generalization methods, comparative, structural and logical analysis. Correlation analysis will be used to find the relationship between government expenditure and public safety and other economic indicators. Analysis and the strength of the obtained results that will be made in this article will help to reach the aims and make final conclusions.

2. Structure of Government expenditure

According to Spanish economist J. Ferreiro (2009), government expenditure at first should be analyzed based on functional expenditure. It is convenient, because expenditure is divided into sectors. It is also recommended to use the same expenditure classification that is accepted by the European Union. It allows comparing different countries between each other. There are the sectors in functional classification: social protection, housing and community amenities, education, economic affairs, defense, health, public order and safety, environmental protection, general public services, recreation, culture and religion. Expenditure for recreation, culture and religion in some literature might be found together, and in some - separated into different sub-sectors. In Lithuania we can find another two sub-sectors: expenditure for the debt management and expenditure for the budget of EU. According to functional classification these sub-sectors could be put together into sector of general public services without distinguishing them from widely accepted classification.

There are different opinions about how to divide government expenditure. Ravallion (2002) is dividing these expenditure into social and non-social, but from this point of view, some of social expenditure might be productive, and other not productive at all, so it is better to divide government expenditure according to its productivity. A.U.I. Clement and E.O. Dickson (2010) are dividing government expenditure into recurrent and expenditure for capital creation. Recurrent expenditure are not accumulated and are used for consumption, so such sectors are financed every time from beginning, while expenditure for capital creation has lasting value, are designed for investment and have long-term accruals. T. Stratman and G. Okolski (2010) have an opinion that government expenditure increases the consumption of private sector, and money that are collected to the budget are allocated unproductively. There is also different opinion that seems to be the fairest - to divide government expenditure into productive and unproductive expenditure. There were a number of researches made, which divided mentioned sectors of expenditure into these groups. As Gray (2007) wrote, proper management of productive and unproductive expenditure (not balancing them!) might have positive impact for economic growth of the country. Irmen and Kuehnel (2008) states that unproductive expenditure has instant affect and has influence only in the short-term, while the productive expenditure are effective in long term and have a lasting value. This classification was also analyzed in researches of Liubimova and Žigienė (2010), Ferreiro (2009). As productive expenditure we can assign expenditure for education, defense, economic affairs, housing and community amenities, health, environmental protection and public order and safety. Expenditure for education enhances improvement, so educational services at higher quality are given for those who will create Gross Domestic Product (GDP) of the country: schoolchildren, students, teachers, academics and their higher competences. Expenditure for defense, public order and safety are productive expenditure, because it influences activity of Lithuanian soldiers, public order officers and their competitive. It can be said that higher GDP will be created in a country that is safe. Expenditure for environmental protection promotes using various projects that are intended to avoid harm for the nature, promotes using alternative energy resources, pollution reduction. New inventory and methods help to create higher economic value more effectively and cleaner. Expenditure for health is needed for researches and new medical equipment. This helps to find illnesses faster and apply correct type of treatment immediately.
Society that has guaranteed high-quality health care can work without fear and develop higher country’s welfare. According to Ferreiro (2009), expenditure for the economy includes research and development, transport, communications and foreign relationships. Most scientific researches that promote economies to invent a new, alternative, more efficient and environmentally-friendly inventions get quite meager state budget.

Unproductive expenditure hampers economic development and inhibits its growth. Large unproductive expenditure require additional financing, which is often obtained through higher taxes, and all money that are taken from the private sector is used to spend, instead of being invested and would generate greater economic returns, higher GDP and interest rates in the future. Professor Holcombe (1998) claims that increase in government expenditure by 10% influence decrease of the country’s GDP growth by 1%. Unproductive expenditure includes expenditure on recreation, culture and religion. Although these sectors are important, they only satisfy the needs, beliefs of certain groups of people, and create a short-term, non-persistent value. Other large part of expenditure that consumes a lot of financial resources from country’s budget is social protection. Social benefits and allowances are classified as non-productive not only because they do not create economic value, but also because they motivate people not to create it. Paying unemployment benefits from the budget their needs are satisfied, and it demotivates and inhibits their willingness to work. Other unproductive expenditure is contributions for European Union, funds for government debt management, and expenditure for general government services. These costs are necessary, but it inhibits economic growth. Huge government borrowing during crisis period leads to a significant need for funds to debt repayment obligations and the redemption of bonds. As a member of the EU Lithuania commits to pay their contribution to the common EU budget.

Both, productive and unproductive expenditure is needed, but anyway - both of them are expenditure. Without active government management of productive and unproductive expenditure, economic growth would show up only in long term period (Irmen, Kuehnel 2008). The COFOG classification that is given is divided into productive and unproductive sectors, and it might be, that these sectors differ in different countries, so the same classification cannot be applied for all countries. In some cases COFOG classification might be used, i.e. comparing expenditure of different countries between each other, but when talking from national aspect, some of productive expenditure might be unproductive, and vice versa. This article analyses if government expenditure for public safety and defense is really productive. To find out that, it is not enough to make a conclusion according to unsubstantiated statements, but the analysis of statistical data must be done. It is possible that according to statistics, some of government expenditure sectors nationally might differ from COFOG classification.

3. Government expenditure for defense and public safety

Government expenditure for defense and public safety put together takes a significant part in productive government expenditure, so it is interesting to see if it is healthy for economy and conducive to reduction of crime. When being a part of NATO, Lithuania has international soldiers and fighter jets dislocated at the north of the country which also requires additional financing. But being a part of organization helps to reduce expenditure on safety, because some of the expenditure is common for all the members of organization.

Defense sector is very important for the country in order to keep its sovereignty and to be ready for the possible attacks from inimical neighbors. When saying that we dispose of European union countries, but we have in mind Russia, which would like dictate to Baltic countries its own rules for gas and oil. The defense that we have in Lithuania would not be able to stand alone against this giant, but being a part of big organization gives opportunity to join forces where the most help is needed. Because of this fact we have foreign missions and our soldiers help other countries, so it is easier to reach the same aims and objectives.

Public safety sector is not as broad and international as defense sector. It works nationally and it is intended to keep public order in the country. If we think that unemployment and poverty have direct impact on the growth of crimes (Šileika and Bekerytė 2013), then it is a sign of weak economic situation in the country. If economic situation is good, then unemployment level is lower, the financing for public safety is higher and level of public order is higher. As Šileika and Bekerytė (2013) wrote, for many peo-
ple, especially for impoverished ones, goods acquired from crime can outweigh the risks, so it can be suggested that poverty should increase crime rate. But if the government assigns enough financing for public safety, this threat can be minimized and public order can be kept at the best appropriate level.

In order to see which part of government expenditure is given for each of these sectors, statistical analysis should be made. Figure 1 shows how government expenditure for defense and public order changes during the last six years according to total government expenditure. As we can see, government expenditure for defense is decreasing: during last six year it decreased by 41%. But government expenditure for public order and safety increases, so total result is that government expenditure for both sectors in common is increasing. From the figure below, we can see that the level of these expenditure fluctuate depending on the total expenditure. From statistics we can see that local (micro) issues get more financing than broad issues (macro), where micro is Public order and safety and macro - defense. Let’s say that defense is needed, but people barely feel its existence, while public safety and public order can be seen every day. Of course, being a part of global defense organization helps to minimize expenditure for defense, so the bigger part of money can be assigned for local problems. If there would be a demand for more expenditure for defense, it would be easier to reallocate assignments and swap some money from public order and safety. There are authors who state that better economic situation influences lower level of crime and higher safety in the country, but I haven’t found researches on the effectiveness of government expenditure for defense and public safety and its relations to economic situation in Lithuania.
It might be stated that there are less crime in richer countries, but it is needed to substantiate that by statistical data. In Figure 2, number of criminal offences per 1000 inhabitants is showed. There were Lithuania and 4 other countries selected randomly. Let’s say, according to GDP, that two of them are small economies (Bulgaria, Estonia) and other two - bigger economies (Denmark, Italy). As we see from the graph, those countries with big economies have higher rate of criminal offences than those countries with smaller economy. Because of this fact we cannot state, that richer countries have less crime. As we can see from the statistics, poorer countries have lower rate of criminal offences. This can be described by the difference between rich and poor - where this difference is higher, there are more criminal offences.
Other graph shows what difference in the same countries, when giving assignations for public order and safety, is. As we can see from Figure 3, assignations for this sector are highest in those countries, where the number of criminal offences was lowest. It can be thought that assignations are lower because economy is big and as a number, government expenditure is sufficient enough, and the sector is saturated. But the statistical data about criminal offences shows opposite - those countries, which take more attention to this sector, have better results.

![Graph showing assignations for defense in some EU countries](image)

**Fig. 4.** Assignations for defense in some of EU countries

*Source: Prepared by authors according to Eurostat.*

When talking about assignations for defense (Figure 4), we can see different situation: assignations for defense in big economies are quite stable, but in smaller economies it is fluctuating. Government expenditure for defense in Lithuania is decreasing and is among lowest in European Union. Lithuania, according to the latest certified statistical data, feels safe as much as Germany, Spain and Switzerland. But do we feel so safe and don’t have what to fear about?

Statistical data analysis showed that opinion that richer countries are safer and there are less criminal offences, is wrong. It was found that poorer countries invest more in public safety (according to GDP), and there are less criminal offences and in richer countries it is opposite. Government expenditure for public safety in Lithuania is increasing, while expenditure for defense is decreasing and now is at quite low level and needs more attention.

### 4. Relationship between government expenditure and public safety.

Public safety and defense depend on the financing from the government. Because government has to allocate revenue from the budget, it is possible that there is a relation between government expenditure and criminal offences in the country. If we talk not only about government expenditure, but about safety in the country, it is possible, that there would be relations between GDP and crimes, unemployment and crimes. To analyze these and other relations correlation analysis will be made. These relations will show how crime statistics and safety in the country on government decisions and how strong these relations are.
When looking at various different possible relations between economic and safety statistical information, there are several stronger relations found. The relation was found between GDP and police officers, who are responsible for public order and safety. The relation is not very strong, but we can make intensions about possible reasons, why these factors are correlating.

$R^2$ for GDP and number of police officers is -0.57. Negative shows that number of police officers is decreasing when GDP is increasing. It can be said that when there is better economic situation in the country, less police officers are needed. Of course, if we look at Figure 5, we can state that number of police officers was constantly decreasing, but from 2010, after economic burst after crisis, the number started to decrease rapidly. And if we look at long time period and expel crisis from our graph, we would see, that is increasing every year, so it is possible to expect stronger relation between these two factors.

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**Fig. 5.** Relation between GDP and number of police officers  
*Source: Prepared by authors according to Eurostat and Statistics department of Lithuania.*

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**Fig. 6.** Relation between unemployment and criminal offences  
*Source: Prepared by authors according to Statistics department of Lithuania.*
Other relation was found between unemployment and criminal offences (Figure 6). It is logic that there is more crime when unemployment is high, because people feel lack of money, so they try to find other (illegal) ways to live out. $R^2$ between these variables is 0.72. It is quite strong and reliable relation, which shows that country’s safety depends on economic situation and level of unemployment.

![Graph showing relation between criminal offences done and wage](image)

**Fig. 7. Relation between criminal offences and wage**

*Source: Prepared by authors according to Statistics department of Lithuania.*

There is also a relation between Criminal offences and wage (Figure 7). The logic of this relation is very similar to the logic about relation between criminal offences and unemployment: when people are lack of money, they make offences, and when people get too low salary, they also are susceptible to perpetration. This research showed a bit different trend of this logic: $R^2$ between Net wage and criminal offences done is 0.79, which is strong relation and shows that when people gets more salary, they make more offences. It is possible that those, who earn more, can afford themselves to pay more fines. Increase in average salary doesn’t mean that everybody starts to earn more money: it is possible that there was increase in salary for those, who earn more than average salary, so because of that average salary in the country increased. So the difference between minimum and maximum salary in the country increased, and despite
that, producers in order to be up to the market increases the price of their products, the retailers increases their prices a bit more and the final price of the product becomes too big for those, whose salary didn’t increased when counting average salary, so he/she is constrained to make an offence to live out.

Final significant relation that was found during this research was found between GDP and Government expenditure for public order and safety (Figure 8). It was found that the relation between these two factors is very strong and $R^2$ is 0.92. It means that if economic situation in the country is getting worse and GDP is decreasing, then the expenditure for public safety and order will decrease as well and opposite. We can make an assumption that if GDP is increasing, expenditure for public order increases, because of that number of criminal offences done decreases and because of increase of GDP decreases level of unemployment, what also decreases criminal offences.

**Conclusions**

Every topic about government expenditure is very interesting, because it is always about our money, so we must be aware where and how this money is allocated. One of the sectors is defense, public order and safety, and it is very important for the citizen of Lithuania, because their safety and welfare depend on that.

This article showed the structure of government expenditure: both, productive and unproductive. Government expenditure for defense and expenditure for public order and safety is a part of productive expenditure and is thought to make positive influence for the economy. The research showed that government expenditure for defense is decreasing, but for public order and safety it is increasing several recent years.

When comparing criminal offences done in Lithuania and in other European countries, we can clearly see that situation in our country is not bad at all - there are more criminal offences per 1000 inhabitants done in western countries than in Lithuania. This can be a result of government expenditure for public order and safety: in Lithuania this expenditure as percent of GDP is not as high as in other European countries.

The research showed interesting fact, that the number of policemen is decreasing and especially when GDP is rising. This fact can also be influenced by new technologies, speed cameras, street view cameras and so on. It was found that criminal offences relates to unemployment, which is related to economic crisis and GDP. It was also found that government expenditure for public order and safety relates to GDP. It means that if there is better economic situation in the country and government assigns more funds for
this sector, there is higher safety in the country.

It is hard to say if government expenditure directly makes influence for economy of the country, but it is a fact that through other economic elements government expenditure is positive for the economic welfare of the country and safety of its citizen.

References


Abstract. This paper aims at conceptualising and assessing operational environment of small and medium-sized enterprises (SMEs) in sustainable supply chains in regional context. The paper starts an attempt to explore how SMEs in Mecklenburg-Vorpommern in Germany from transport, logistics related value-added services and especially from the air freight sector collaborate, perform and develop from supply chain management perspective, and what crucial determinants for burgeoning business performance and sustainable strategy are effectivity to be linked for the benefits of SMEs. Using a qualitative case study approach, the paper bears on empirical evidences of the project “Baltic.AirCargo.Net” financed by the European Regional Development Fund / European Neighbourhood and Partnership Instrument in the framework of the Baltic Sea Region Programme 2007-2013. The paper builds upon a qualitative research approach involving expert interviews, focus groups analysis and secondary data research based on relevant project documentation and field notes from project meetings and workshops. Findings of the case study from the German air cargo service providers are explored and discussed through key theoretical concepts pertaining to sustainable supply chains and logistics of SMEs. Based on the relevant scholarly work and results of empirical evidence and case studies, a conceptual model is designed with propositions and possible future directions for SMEs. The paper showcases empirical findings gathered from the practices of regional SMEs operating in the air cargo transport and logistics service field, thus expanding this poorly conceived research area. The research is based on direct information and insights from SMEs located in Mecklenburg-Vorpommern and highlights how SMEs under the given circumstances may streamline their development paths operationally, tactically and strategically. Insights obtained from this paper can be employed as critical tool among SMEs’ managers, strategy planners and policy decision-makers on how to utilize SMEs’ practices in the context of supply chains, logistics networks and emerging scope of globalisation and trade.

Keywords: Sustainable supply chain management, sustainable strategy, air cargo, small and medium-sized enterprises, road feeder services, Mecklenburg-Vorpommern

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Sustainable supply chain management issues: case of regional SMEs involvement in the air cargo

oriented ICT-methods and processing logistic network" that is being implemented in the framework of the EU Programme “Baltic Sea Region Programme 2007-2013”. The focus on SMEs here implies that SMEs’ role and impacts on supply chains and logistics networks have been prioritised on regional and European economic development agendas. The paper investigates SMEs’ behaviour in the air cargo transport and logistics sector from the Northern German region Mecklenburg-Vorpommern and showcases how SMEs may benefit by learning from airfreight forwarders and air cargo related transport and logistics service providers how to perform, collaborate, network, design and implement strategic decisions. The paper calls for an integrated framework, which finds its conceptual roots in domains of supply chain, strategic and small business management, enterprise development, supply networks and supply chain management, enterprise culture and behaviour. Based on the existing thematic concepts, adapted to the environment of SMEs in the regional context, the paper streamlines the pathway of exploring SMEs behaviour in the air cargo supply chains and supply networks.

Supply chains structure and their management are core issues in discourses related to large enterprises (LEs). As a result, topical researches have generated a number of literatures on supply chains, supply chain management. However, scientific works on those themes regarding SMEs are sporadic (Dainty et al., 2001; Macpherson; 2001; Macpherson and Wilson, 2003; Gunasekaran and Ngai, 2003; Quayle, 2003; Arend and Winser, 2005; Hong and Jeong, 2006; Thakkar et al., 2008a and 2008b; Thakkar et al., 2009 etc.). As it is apparent from the topical research scrutiny, SMEs behaviour in supply chains has been increasing research interest in the last decades. This can be traced back to diverse developments on regional and global scale. However, the most important criteria, which implied the shift in the research focus is a rational outcome. Since SMEs are of crucial importance for regional, national and global economics and a significant share of economic performance and value has been recently ascribed to SMEs, they are gaining a rising interest in the research community. SMEs foster entrepreneurial talent, employment generation and industrial development, as they are operating in all industry sectors.

However, beyond the trend of increasing research literature dealing with SMEs in supply chains and affects of supply chain management paradigm for SMEs, the most of the research has concentrated on manufacturing SMEs behaviour in supply chains and supply chain management for manufacturing SMEs (upstream). The link between SMEs from the service sector and supply chains & management is rather underestimated with an exception of several case studies. Furthermore, a very small share of research is done pertaining to the air cargo industry and air cargo service sector. Bernal et al. (2002) explores, however, a case of small freight forwarders in the context of competitor networks, whereas Gunesekaran and Ngai (2003) explains in their case study management of small logistics company, and Halley and Guilhon (1997) behaviour of small enterprises in logistics. Beyond this, studies on small businesses in the logistics discourses are likely to analyse SMEs through internationalisation theories (Chetty and Cambell-Hunt, 2003; Bernal et al., 2002).

It is highly important to redesign and reengineer the role of SMEs in the regional context. To date, in the case region of Mecklenburg-Vorpommern SMEs’ role is crucial, since nearly the entire regional economic structure is scaled by small businesses. Around 91 per cent of SMEs operating on the market have less than 10 employees. Despite this prolific number SMEs are likely to remain at the grassroots level when speaking about the specific area of the supply chain in the air cargo transport logistics (Statistical Office of the Federal State Mecklenburg-Vorpommern, 2011). Currently, we mostly speak of large shippers and forwarders who process air cargo volumes. In this regard, the paper at hands aims at contributing to the emerging research on SMEs behaviour and performance in the service-oriented sector. More specifically, the key objective is to underpin the role of regional SMEs in the air cargo industry, and especially, air cargo service providers’ paradigm.

The paper is structured as follows. The research has first set about identifying key phenomena and issues from the fragmented literature base pertaining to supply chains (especially downstream activities) and SCM. Afterwards, elements and methods of the research are explained. The next section reflects results from the case study. Subsequently, implications are derived from the observed SMEs behaviour and performance in the air cargo supply chain and networks and presented by key managerial, strategic and oper-
ational concluding insights in terms of SMEs future directions and research contributions.

2. Literature review

In the scientific circles, SMEs have been largely perceived from the perspective of Large enterprises (LEs), i.e. most of the concepts and approaches developed to understand SMEs behaviour and performance in supply chains flow from the scholarly works, once generated for LEs. SMEs performance and operational configurations in supply chains have been dealt in different research streams pertaining to supply chains, namely, strategic alignment of supply chains, coordination of players in supply chains and configurations of logistics networks including infrastructure design, market servicing etc. (Creazza et al., 2010, p. 155). Cooper et al. (1997) believes that all these processes mentioned are encapsulated by the SCM concept. Respectively, scholars underpin that SCM incorporates supply chain players with whom to link processes (1), the processes themselves (2) and how these processes are linked, managed and integrated (3) (Cooper et al, 1997, p. 6). Whereas players in supply chains constitute networks, business processes are activities, which generate specific output of value to the customer. Finally, the management implies managerial skills, resources and variables by which the business processes are integrated and managed across supply chains. Herein, crucial is identification of supply chain members, processes to be linked and of type / level of integration of those processes (Lambert et. al, 1998, p. 4).

Taking into account the present research scope, it interferes with phenomena ascribed to all the three research lines, as differentiated by Creazza et al. (2010), as the research addresses issues concerning SMEs strategic behaviour, involving questions relating to SMEs partners and collaboration within supply chains or pertaining to logistics networks through placing a focus on the air cargo industry servicing SMEs. Bearing in mind that SMEs business behaviour and operational activities in the service-oriented sector (here: SMEs as air cargo transport and air cargo related service providers), the conceptual foundation of the research derives from the concepts and approaches elucidating SMEs strategic thinking, planning and acting, organisational behaviour (integration and networking) and performance in the air cargo supply chain. In this light, phenomena, processes and activities are referred from the entrepreneurial and management perspective. Consequently, the research pertains management-related practices of SMEs. Hence, a supply chain management (SCM) within the context of SMEs refers to set of business activities, from purchase over processing to delivery to LEs (Thakkar et al., 2008a, p. 98). More explicitly, SCM is integration of key business processes from end user through original suppliers that provides products, services and information, which add value for customers and other stakeholders (Lambert et. al, 1998, p. 1). In order to ensure regular orders from LEs, SMEs are forced to enhance value of end service products through offering special and differentiated features and quality (Thakkar et al., 2008a, p. 98) or stressing behavioural qualitative differentiation and innovation (O’Gorman, 2001, p. 61). This is a critical issue, as delivering qualitative and differentiated services underlie a set of physical tangible and intangible resources and organisational capabilities, as needed by SMEs, such as technological peculiarities, infrastructural facilities, financial resources, information and knowledge in SCM, management skills etc. (Kraus et al., 2006; p. 335-337). Strictly speaking, SMEs have to possess specific organisational, tactical, operational and strategic advantages to be able to compete efficiently in supply chains and transport networks. According to Porter, competitive advantage derives from organisation’s activities in the external environment or on the market, i.e. how those activities strategically fit in the external environment or on the market and therefore creates economic and customer value (Porter, 1985, p. 35; 1991, p. 103). In the present context, SMEs have to fit their service-oriented activities, technology and the marketing strategy to their customers, i.e. to LEs that operate in the air cargo supply chains. Nonetheless, progress and differentiation is needed not only externally but also internally, i.e. through advancing organisational internal structures, resources employment, capabilities streamlining and development of core competences, as anchored in treatises on the resource-based view (Wernerfelt, 1984; Barney, 1991; Peteraf 1993, Prahalad and Hamel, 1990; Boxall, 1996 etc.). As a result, in gaining capabilities, effectively deploying resources, advancing organisational internal activities and adapting them to the customers and the air cargo supply chain environment, SMEs may be both proactive and reactive in terms of their performance and strategy. Hence, it is not enough anymore to be
only reactive and more cash focused, ignoring power of communications, internal knowledge and learning capacity, offering few services and deploying “classical” resources. The resources should be valuable, rare, imperfectly imitable and non-substitutable (Barney, 1991, pp. 105-106; Boxall, 1996, p. 65). Herein, a more novel way of thinking and operating (Thakkar et al., 2008a, p. 99; 2008b, p. 77; Kraus et al., 2006, p. 341-342) or new approach towards mutual understanding of different operational cultures of SMEs and LEs, trust building and communication skills advancing are needed (Dainty et al., 2001, p. 171; Machpherson, 2001, p. 9). As stressed by Vaaland and Heide (2007), SMEs will not be able to harness a full potential of SCM in terms of diverse management and integration procedures as applied to business process within the supply chains anymore, since SMEs are managed by LEs at arm’s length and have to follow their standards and norms. Moreover, due to the price factor and relatively high supply side, already involved SMEs may be easily replaced by the competitors in the supply chains (Vaaland and Heide, 2007, p. 21).

Nevertheless, in many respects, SCM enables to combine external and internal processes and activities of SMEs. More specifically, SCM implies a streamlined approach to advance organisational performance tactically, operationally, and strategically. For instance, integration within the supply chains can be improved by means of internal processes and activities, such as communication, collective decision-making, partnering, trust building etc., whereas SMEs’ performance in supply chains affects SMEs growth, planning and strategy (Thakkar et al., 2008a, pp. 110-112). From the external perspective, SMEs need to decide where to compete and how to compete (O’Gordman, 2001, p. 60). They need to clarify their strategic position in the supply chain and focus, i.e. compete in terms of low costs operations or value added operations (Hong and Jeong, 2006, p. 295).

Beyond a certain qualitative differentiation and level of innovation with combining resources and capabilities, important is in the supply chain context also a clustering perspective. As originally developed concept of clusters by Porter in 1990, clusters as geographic concentrations of companies, suppliers, service providers or institutions are crucial for competitive advantage, innovation, knowledge and technology exchange and absorption as well as learning capacity. They enable both competition and cooperation (Porter, 2000, pp. 15-16). Networking and cooperation helps SMEs to overcome size and resource constraints, reduce costs and circumstances of uncertainty (Thakkar et al., 2009, p. 982). Furthermore, it facilitates development of individual relationships as part of a network, which is, in turn, perceived as construct of interdependent relationships. Since relationships are connected, they may positively or negatively affect SMEs behaviour in other networks. However, largely, through exchanging relationships across SMEs or, in other words, networking, SMEs are able to provide their customers with greater value than if SMEs would work individually. Through interconnected activities SMEs can work faster, more efficiently than competitors outside their network and therefore they can achieve flexibility, develop new business opportunities or find sources of new capabilities, resources and advantages in the network. Herein, through networking SMEs gain competitive advantage or, through developed collaborative relationships able to achieve critical resource of internalisation, intra- or inter-organisational learning (Bernal et al., 2002, pp. 244-245). Key reasoning behind entering and pursuing collaborative relationships is asset specificity and uncertainty. Herein, mutual trust and experience in collaborative relationships are likely to reduce uncertainty of transactions within those relationships, and therefore the transaction costs. Hence, due to informal contracts, mutual trust etc., a higher motivation might be observed by organisations to enter the supply chains. In terms of specificity, through networking activities, i.e. less geographical, physical and human distance, the relationships can be more specific, thus the SCM becomes more simplified (Macpherson, 2001, pp. 6-8).

SMEs business performance, competitive advantages and strategy can be sustained in the SMC context through intertwining of all three dimensions of sustainability, i.e. economic, environmental and social ones (Cliberti et al., 2008, p. 1580). It has been frequently referred to more specific focus by SMEs on social responsibility, environmental awareness etc. The aspects of sustainability in the SCM discourses are gaining more resonance as a response to the current environmental challenges, globalisation trends etc. Nonetheless, an increasing incorporation of sustainability phenomenon is frequently tapped in the context of SCM of LEs. However, in terms of SCM of SMEs, sustainability issues can cover such
criteria as product-based green supply, environmentally friendly decision-making, cost reducing. Strictly speaking, sustainability refers to issues in SCM paradigm, whether environmental, ethical or social ones (Seuring and Müller, 2008, p. 456). For instance, Jorgensen and Knudsen (2006) interpret sustainable SCM as a form of value chain governance, since sustainable SCM encompasses aspects of labour, environmental standards etc. In this regard, values are affected in terms of social, environmental or labour-related settings and through two key functions within the value chain, i.e. rule making and rule keeping. Whereas LEs as rule-keepers control technologies, brands and access to market have started to apply certain sustainable standards, e.g. environmental protection or labour rights etc., rule keepers (SMEs) have to comply with those standards applied by LEs (Jorgensen and Knudsen, 2006, pp. 450-451). Considering our research context, SMEs behaviour in the air cargo supply chain may be also characterized as influenced by “modern” sustainable issues, since the products delivery by air may be hardly “greener” as compared with other modes of transportation (rail, sea, road). As a result, an environmental issue here is a sustainability criterion. Furthermore, SMEs have to follow rules and standards on LEs as applicable in the air cargo forwarding in order to stay integrated in the air cargo supply chain.

4. Methods

Case study has been used as a technique in exploring SMEs behaviour and performance in supply chains, logistics or when examining the role of SCM for small businesses (Gunesekaran and Nagi, 2003; Bernal et al., 2002 etc.). A case study method is assumed in this research paper as an appropriate one. The justification behind this choice is that the research aims at answering the questions how SMEs as local / regional airfreight forwarders and air cargo related transport and logistics services providers are operating at present within the national and global air cargo supply chains or networks as well as what determinants (capabilities, competences and other requirements) must be available to enable to outline a sustainable strategy for SMEs performance. Following Yin (2009), a case study research places focus on contemporary phenomena rather than on historical events. It normally addresses questions “how?” and “why?”. Although this qualitative method leaves little room for researchers to control events (Yin, 2009, p. 2), it enables to catch the particularity and complexity of a single case (Stake, 1995, p. xi). In order to provide the most comprehensive view on development of SMEs, this research follows a collective case study, which encompasses a number of single cases, i.e. SMEs operating in the air cargo supply chain existing in the case region of Mecklenburg-Vorpommern (federal state level). Herein, single case studies frame a collective or a multiple-case study. The qualitative case study approach is exploratory and explanatory (Yin, 2009, pp. 8-9), as the research sets out to scrutinise development patterns of SMEs in the air cargo supply chain and to test how SMEs may pursue a sustainable way in collaborating, operating and benefiting in the air cargo supply chain and by means of SCM.

Empirical data used for the cross-case analysis were obtained in the frame of the project “Baltic.AirCargo.Net” financed by the EU the Programme “Baltic Sea Region Programme 2007-2013”. The empirical material was collected from diverse sources of evidence over the period of project life cycle (2011-2013): qualitative observations of researchers involved into the project activities, external experts’ evaluations, project documentation and observations gathered from respective project activities such as workshops, conferences as well as from the field notes from project meetings. Empirical data pertaining to SMEs are explored. Furthermore, a record of empirical evidence is complemented by semi-structured interviews conducted with the SMEs representatives or related stakeholders.

The analysis of qualitative empirical data builds upon topical concepts and approaches introduced above. The paper portrays the results in line with the concepts and approaches synthesised in the previous section. The observed and evaluated outcomes and outputs from the SMEs practices serve then for outlining propositions. Respectively, the propositions are tested and discussed by bearing on the empirical evidence.

5. Findings

Current SMEs practices in terms of the air cargo supply chain and the air cargo transport networks in Mecklenburg-Vorpommern have been traced and evaluated on the basis of evolutionary approach, i.e. how these practices emerged, how do SMEs perform and what future directions do result. In other
words, the findings are reflected through SMEs pace of development. Besides, following Hong and Jeong (2006, pp. 297-298), a model as proposed by Levy in 2001 has been adopted. Referring to Chetty and Cambell-Hunt (2003, p. 813), some conceptual stages were slightly modified. As a result, SMEs practices and performance are explored through three external or internal contextual dimensions: (1) air cargo forwarding sector and position in the air cargo supply chain (external environment), (2) external relationship patterns of SMEs within the air cargo supply chain and (3) SMEs structures, management and competences.

**Air cargo forwarding sector and position in the air cargo supply chain**

In this context, regional airports and other service providers are referred to as logistics service providers focusing on regional operations, and the logistics as a third-party logistics (Gunasekaran and Ngai, 2003, p. 826). Taking into account SMEs performance in the air cargo sector on the regional scale, empirical evidence has shown that the airfreight volumes, as handled by the regional airports Parchim and Rostock-Laage, are rather scarce. This is due to the large air cargo forwarders TNT, DHL, FeDex and alike, which are treated on the air cargo market as the first-tier transport providers. This, in turn, reduces the number of second-tier service providers in the downstream air cargo supply chain. Furthermore, of vital importance is in this particular case the prevalence of clusters. With the key air cargo forwarders concentrating around Berlin and Hamburg, the airports in Berlin and Hamburg have gained competitive advantage over air cargo transport service providers in Mecklenburg-Vorpommern. Herein, clustered air cargo forwarders can compete and cooperate directly against service providers operating individually in the region of Mecklenburg-Vorpommern through their already settled strategic alliances and collaboration with more dominant suppliers, distributors or carriers (Hong and Jeong, 2006, pp. 293-294). In this case, regional airports of Parchim and Rostock-Laage are missing resources, and competences such as inter-partnering or share of valuable information, knowledge etc. The fear of sharing the valued organisational information and knowledge can come to threaten the market position and organisational performance of the regional airports (Bernal et al., 2002, p. 242). Hence, it becomes quite difficult to compete without being networked or a part of cluster. Nonetheless, as empirical data demonstrate, a geographical proximity and limited resources, such as air cargo handling capacity in Berlin and Hamburg due to, e.g. increased demand in air cargo forwarding, provide feasible opportunities for the regional airports.

**External relationships patterns of SMEs within the air cargo supply chain**

A more isolated position of the regional airports has affected their external relationships within the air cargo supply chain. Operating on behalf of core national logistics services providers (Deutsche Post and Lufthansa Cargo) to meet their objectives, i.e. to enable them costs reduction, cover their fluctuating (increased) demand or reduce their capital investments, regional airports have failed in sustaining their position. It is because the regional airports were not able to deliver more differentiated and qualitatively higher services, and the large logistics services providers exerting a more influence in the freight forwarding industry could easily replace them or cancel their negotiations due to les flows (operations) through the air cargo supply chain. As a result, the regional airport of Rostock-Laage, as initially incorporated into the network of “Deutsche Post” to handle the airmail forwarding at night due to increased demand in the airmail forwarding in Mecklenburg-Vorpommern, has been cancelled to deliver this service. Hence, frequently the external relationships are of more short-term manner. This, again, is shaped by the external environment in which the relationships emergence and are maintained. By echoing Hong and Jeong (2006, p. 298), in the environment of low costs competition, especially in this particular case, where the core focus is on cost reduction and capital-based savings, regional airports, as exemplified in case of Rostock-Laage tend to accept costs reduction target terms dictated by their customers (Deutsche Post) due to their weak negotiating positions, as they do not have negotiated acquisition ex ante (Thakkar et al., 2009, p. 983).

In case of the regional airport Parchim, the managers have set to kick-off air cargo transport and related services at the airport through cooperation with China and potential air cargo flows from China. However, herein in this particular case, it is to note that the airport is not likely to harvest benefits of being integrated in the global air cargo supply chain and the network
due to very limited resources. Since air cargo processes and activities cannot be performed at the Parchim airport as a result of infrastructural shortcomings, the airport and the related air cargo service providers are not able to follow and adopt to the requirements as posed by the LEs in the air cargo industry. This is also curtailed due to regulatory constraints applying in the air cargo forwarding and handling industry. As long as there will be no valuable resources available at the airport, it will be not possible to deploy them and to build up distinctive competences that, in turn, allow obtaining competitive advantages in the market (Thakkar et al., 2008b, p. 81). In this particular case, Parchim airport underlies, first, reengineering or acquisition of physical resources such as facilities (runway, apron, airport tower and business settlement area). With resources (facilities) built up, the airport will be able to service large international carriers and achieve international standards (CAT III), and therefore gaining competitive advantage over other regional air cargo forwarders and service providers. Positively influenced is also the competitiveness through intangible resources or invisible assets, such as good knowledge and management skills. Herein, from the case it is evident that good knowledge of customers enabled through Chinese ownership of the airport, can accelerate air cargo handling activities (air cargo flows between Europe and China), thus allowing the airport to carry out activities differently from the competitors (gaining positional advantage through handling cargo directly from China).

Overall, potential positioning advantages for both regional airports are likely to emerge from their networking with the globally operating airports and air cargo hubs, such as Berlin, Hamburg etc. Bearing in mind geographical proximity with the existing air cargo handling clusters in Berlin and Hamburg, it is argued here that regional airports will be capable to deliver qualitative and differentiated services through deploying geographical location as a resource for air cargo handling at the Rostock-Laage airport, for instance, at night, which is possible due to either rural character of the region and lower population density and no night noise restrictions. Further advantages for this airport derive from the infrastructural (good traffic connection by road, business enabling facilities such as business parks), business (global carriers located such as Lufthansa Cargo) and geographical peculiarities (access to transport mode by sea through Rostock port as a maritime node).

SMEs structures, management processes and capabilities

In terms of SMEs structures, current management process and capabilities, it is evident from the empirical data that the regional airports and SMEs face organisational, management and institutional constraints. To exemplify, as evident from the interviews and experts’ analyses, regional capabilities are jeopardised by missing knowledge, information and experiences in foreign business development, market setting in the target countries, lack of skilled labour or human resources processing international trade agreements etc. This embraces corporate or organisational resources that are a prerequisite for building up core competences, as to Prahalad and Hamel (1990, pp. 5-7). Furthermore, as articulated by interviewees and experts, there has been observed shortcomings in knowledge gathered through education. Following Dainty et al., 2001, for the SMEs to be integrated into the supply chain, there is a need for specific training programmes for SMEs providing both specialised knowledge and soft skills such as interpersonal skills, customer care, communication skills and collective learning (Dainty et al., 2001, pp. 169-170). To underpin this, by referring to observations made on a regional scale, one of the key weaknesses of SMEs as logistics service providers is lack of international competences and international orientation as well as missing trainings.

Furthermore, as it is apparent from the evidence, SMEs, especially in case of the regional airports are not willing in exploring and realising possibilities through shared knowledge and horizontal collaboration. In this, the small business sector in Mecklenburg-Vorpommern can be recognised as a reactive one, since it is drive by the visions and aims corresponding to the external environment in which those businesses are operating. This is a more passive view in contrast to businesses, which show higher deployment of intangible organisational competences such as knowledge and information share as well as trust.

6. Implications for SMEs: Determinants for SMEs future directions

Referring to the past and current SMEs practices and their endeavours to engage into air cargo supply chain and the air cargo network, a set of implications can be drawn to facilitate future-oriented directions of SMEs. The central clue is a need to decide where to compete and how to compete (O’Gordman, 2001,
p. 60). It is an external view. On the one hand, SMEs need to clarify their strategic position in the supply chain and strategic focus. On the other hand, there is a deficit in internal capabilities, trust built up, management skills, team building, understanding of business etc. (Dainty et al., 2001, p. 169). Again, when recalling the duality of markets and resources (Wernerfelt, 1995, p. 172). Hence, combination of both perspectives is needed.

As a result, SMEs have to make strategic choices (O’Gorman, 2001, p. 60) and to clarify their strategic focus and supply chain relationship position (Hong and Jeong, 2006, p. 295). Based on the empirical results, SMEs need to redirect their strategic choices to the following external and internal contexts.

Hence, the present research reasons that:

**Proposition 1:** SMEs strategic positioning in the air cargo supply chain and their growth underlies a type and degree of collaboration with large air cargo forwarders operating in the air cargo supply chains and global networks.

The present research argues that SMEs involved into the air cargo forwarding or handling services as well as regional airports as the air cargo operations have to intensify collaboration partners with large and globally operating enterprises in the air cargo industry. This enables the small businesses, first, a better relationship positioning in the supply chain, since large airfreight forwarders as the first-tier logistics providers have focused on delivering multiple performance based on their competences. In this sense, SMEs could focus on the specific competences and offer differentiated services, thus meeting qualitative requirements of their customers. Through specific and differentiated services SMEs and regional airports are capable to gain a strategic position on the niche air cargo market, which is not fully penetrated by large air cargo forwarders and handling enterprises. Considering the regional case of Mecklenburg-Vorpommern, regional airports and SMEs should endeavour to foster collaboration with the national / global first-tier air cargo forwarders situated in Germany, e.g. FedEx in Frankfurt am Main, DHL in Leipzig Halle and UPS operating in Cologne/Bonn. In this regard, they could place more focus on building competences in the field of warehousing, air cargo handling and transportation.

According the finding from Baltic.AirCargo.Net project, one of the most promising opportunities in terms of air transportation services that might be suitable for SMEs or entrepreneurship is a so-called “Flying Truck” concept or Road Feeder Service (RFS), which would enable providing differentiated, specialised qualitative services. In fact, the pure air-freight-forwarding sector implies very high investments for the buying, leasing, maintaining, etc. of the machinery park, i.e. aircrafts. It will be rather a provocative assumption that SMEs may possess the required financial resources to start / enter pure air-freight operations. However, according to the secondary research data gained by the “Baltic.AirCargo. Net” project, among ca. 18 companies that offer air-freight transport services in Germany only few possess real aircrafts. The whole fleet of majority of air-freight forwarders consists of normal trucks only and the majority of these transport companies that have been successfully operating on the air cargo transport market are regarded as SMEs. And that were not the huge investments in the “hard-ware” infrastructure, i.e. aircrafts that allowed them to enter airfreight forwarding business, but rather strategically conceptual and “soft” changes. Rather small and medium transport companies with a “fleet” ranging from 10 to 30 ordinary trucks qualified themselves for air cargo transport business. According to the results of the “Baltic.AirCargo.Net”, the importance of the RFS is constantly growing nowadays, e.g. in 2012 the relative volume of air cargo transported by “flying trucks” in the biggest air cargo hub in the Baltic Sea Region - Copenhagen Airport is ca. 35% from the total cargo volume.

The definition of “flying trucks” is scheduled trucks operating between two airports only, on behalf of an air carrier. Trucks are operating under a flight number and the cargo is moved under same conditions as normal air cargo and the liability is in accordance with the Montreal Convention. In other words, “flying truck” operates as a normal truck between to airports (departure from an airport security zone – and arrival to another airport security zone only) on so-called Air Waybill (AWB) or air consignment. The same as a real air carrier, a “flying truck” might have several route numbers or flight numbers if it is transporting freight from more than one airline. The flying trucks are treated and handled exactly in the same way like real aircrafts, i.e. the “flying trucks” possess herewith exactly the same insurance as if the goods were transported by aircraft and on route number, they are fulfilling all custom and security regulations set by the relevant authorities as if the
goods were really flying by air (Grandjot et al., 2007, p. 87). The cargo transported by “flying trucks” is a real air cargo that must have fulfilled all required security and transport norms that apply to air cargo.

By providing such road feeder services SMEs would obtain essential advantages in the air cargo supply chain. This can be justified as follows. First, air cargo handling by means of flying trucks would allow SMEs to take advantages of the air cargo market and integration with large air cargo forwarders, e.g. from Hamburg, Berlin. To exemplify, road feeder services do not require intensive capital investments and physical resources what would be a premise in case of providing air cargo services by means of air-carriers (airlines). SMEs do not simply possess such resources. Naturally, by offering RFS to their customers from the air cargo hubs in Hamburg or Berlin, SMEs would better engage into the air cargo market and the air cargo supplier network. This is essential, since, as elaborated by Thomas and Barton, low technical capabilities of suppliers and limited physical resources (facilities, physical capital etc.) are likely to keep large air cargo forwarders and carriers from using in their supply networks and as part of their supply chains (Thomas and Barton, 2007, p. 491).

Second, integration of road feeder services into the SMEs operations would maintain their flexibility both in terms of costs and investments. Indeed, it is evident that SMEs providing flying truck services would not be subject to high investments, as opposed to investments related, for instance, to facilities if operating through regional airports. In this case SMEs would also be less exposed to risk associated with flying trucks operation costs.

Naturally, SMEs could offer distinctive service components to their larger partners due to meeting the order qualifier requirements of qualitative and time-sensitive delivery, as posed by large collaboration partners (Hong and Jeong, 2006, p. 295). Following Levy et al. (2001), by providing road feeder services SMEs would strategically focus on operating at competitive rates, as they do not usually have substantial financial resources to handle air cargo through carriers (airports), and meet changing customer requirements, e.g. reduced demand on air cargo forwarding or handling. Overall, it is very essential for SMEs to bear on this business opportunity, especially as customers, in this particular case large air cargo forwarding companies, are not keen to engage into relationships with suppliers if they are inflexible and lack technical capabilities. In such cases, large customers are more likely to outsource their air cargo forwarding activities to such suppliers, which meet their requirements, even despite the fact that these may be located in more remote regions. The road feeder services offer certain opportunities, e.g. SMEs would become capable of obtaining higher position in the air cargo supply chain as a result of the distinctive values they may provide to their customers, such as flexibility, time and costs savings for outsourced activities by large air cargo forwarders.

Proposition 2: Through interlinking with regional, national or international networks, organisations and institutions SMEs are capable to integrate in the air cargo supply chain and improve their relationship position.

Networks are crucial for small businesses. This is due to the fact that networks imply interdependent relationships, which can positively or negatively affect interactions of SMEs within the networks. Moreover, collaborative relationships within the networks are of paramount importance for competitiveness and competitive advantage. As elaborated by Bernal et al. (2002), collaboration within the network may enhance capabilities of SMEs, since these obtain access to resources and capabilities of other SMEs or organisations involved in those networks. Relationships within networks enable the firms to gain, as what Kanter (1994) calls, collaborative advantages. Beyond this, collaborative activities of the SMEs within the networks are likely to be conducive to access to new resources, enhance financial and organisational flexibility and contribute to inter- and intra-organisational learning and fostering absorptive capacity (Cohen and Levinthal, 1990, p. 128). To exemplify, due to low demand for air cargo forwarding and handling in Mecklenburg-Vorpommern, SMEs tend to be locked-up. In case of entering and integrating into new networks with enterprises (e.g. manufacturing, maritime etc.) from Mecklenburg-Vorpommern, SMEs would gain possibilities to increase the demand for cargo forwarding. Regional airports should also engage into the business networks, as according to the results from “Baltic.AirCargo.Net” up to date small and regional airports operate rather isolated. The role of networks is inevitable, since involved businesses are capable to develop new business opportunities and gain access to stronger support structures (Bernal et al., 2002, p. 245).
Networking facilitates sharing of information and knowledge among partners who are geographically dispersed (Gunasekaran and Ngai, 2003, p. 830). Partnership is not a question of resources, but of establishing demand for services. It facilitates knowledge and information sharing and transfer, which are especially important when SMEs are developing or entering the market (Gunasekaran and Ngai, 2003, p. 836). It is worth mentioning that in terms of inter-organisational relationships the original focus on providing air cargo forwarding services should be extended to a variety of other areas. In case of regional SMEs, these should focus on additional services providing added value for their customers.

Practically, inter-organisational relationships can be built up and maintained through a network, as set to be established by the Baltic.AirCargo.Net project. This network may provide compelling opportunities for both regional airports and SMEs dispersed across the Baltic Sea Region (BSR). Through networking activities, regional airports and SMEs would be better off in utilising road feeder services, especially when these ones will be underpinned by the entire network and networking regional agents, i.e. airports and small and medium-sized businesses. Moreover, the role of network focusing on effective and efficient utilisation of the flying truck concept might be facilitated by cross-networking, i.e. engaging into and promoting this concept in other regional, national logistics, business development and business support networks. Therefore, the SMEs and regional airports should pursue the way in promoting the value of differentiated qualitative value through road feeder services and the promising economic, organisational and strategic benefits thereof.

In this respect, organisationally and strategically SMEs and regional airports can develop through streamlining their internal resources deployment, engaging into knowledge transfer and gaining core air cargo forwarding services-related capabilities and competences. Hence, the paper argues that:

Proposition 3: SMEs building up (internal) organisational capabilities and core competences through learning, training and business networking SMEs obtain better competitive positions in the air cargo supply chain and network.

SMEs do face challenges also on the organizational behaviour level, i.e. in management. In order, however, to overcome challenges, SMEs need to undertake changes. This, in turn, requires shifts in management structures and skills. For this purpose, individual and organisational learning, trainings, skills (especially, as demanded, language and international business operations skills) are needed. Learning processes are of paramount importance not only to bring forward organisational performance. Indeed, they can accumulate economic benefits. By drawing on Cohen and Levinthal, absorbing new information and knowledge and internalising it, SMEs are better off to gain commercial profits (Cohen and Levinthal, 1990, p. 128). Therefore, information and human resources management structures are subject to changes (Halley and Guilhon, 1997, pp. 491-492). SMEs have to build up key capabilities or core competences, as underpinned by Prahalad and Hamel, 1990, pp. 5-7). Furthermore, having streamlined internal capabilities (management skills on business and logistics processes, language skills etc.), SMEs are capable to obtain a differentiated position in a operating environment. To Fillis, in terms of such determinants as intangible skills and other resources as well as creativitiy, trust level etc., SMEs compete unequally (Fillis, 2001, p. 777). Naturally, this enables to distinguish themselves. As a result, SMEs have to kick-off individual and organisational learning and to transform it into a regular cycle, what, in turn, is conducive to sustainability.

7. Conclusions

SMEs reveal shortcomings and challenges in both external and internal contexts (Halley and Guilhon, 1997, p. 482). Sustainable management successes underlie, however, an implementation of a holistic and dynamic model (Chetty and Cambell-Hunt, 2003, p.82). By building upon practices and lessons from the regional small and medium-sized businesses it is apparent that SMEs have come to be isolated and usually act individually beyond the boundaries of the specific air cargo logistics and transport-related networks. This, however, bring SMEs into unfavourable situation, and the entire regional businesses are being jeopardised. SMEs face problems in obtaining capital, resources, skills and novel knowledge and information.

As a response to the regional analysis and scrutiny of SMEs practices on the air cargo market the present research calls for a holistic and interactive model for SMEs, which enables them to respond to the changing
external and internal air cargo supply chain paradigm. Empirical evidence demonstrates that SMEs lack strategic plans and are characterised rather by short-term advantages (Gunasekaran and Ngai, 2003, p. 830). To encounter such situation, SMEs should combine their technological, organisational and financial resources and deploy them respectively. This combination will allow them to acquire capabilities that, first, are to be used in terms of technology. As enlightened in the implications, SMEs should place their strategic focus, on new technologies for air cargo transportation. In this particular context, this refers to a flying trucks model. Hence, bearing in mind market position and market share of SMEs from Mecklenburg-Vorpommern, SMEs should adapt to the external environment instead of relying on inefficient financial and physical capital resources (airport facilities etc.), which then lead to scarce orders or low demand from large contractors.

Subsequently, SMEs have to learn from the current practices and to combine proactive and reactive vision what, in turn, enables better positioning in the air cargo supply chain and sustainable management. Being reactive, SMEs can adapt to air cargo market changes or customers requirements (increasing air cargo forwarding demand from, e.g. Berlin and Hamburg). With the flying trucks concept SMEs could easier adapt to the demands of large air cargo forwarders. Acting with a proactive vision, SMEs are able to gain benefits through their organisation / internal differentiation. Naturally, both visions enable to sustain the position and performance. Consequently, this helps SMEs to overcome some traditional problems.

Furthermore, a better bargaining power and integration of the flying truck concept into small businesses might be achieved through built up collaborative relationships in the specific networks. A better interpartnering can enhance operational performance of SMEs and provide them an opportunity to link up with other networks beyond the regional or national boundaries.

Overall, the authors believe that empirical insights from the current practices of SMEs in the region of Mecklenburg-Vorpommern can be useful in both current research discourses on air cargo supply chain and in terms of SMEs’ role in it as well as in businesses circles. Lessons and experiences learned may benefit SMEs in other European regions in strengthening their performance and rethinking their strategic choices.

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**SUSTAINABLE INNOVATIVENESS: ISSUES AND PUBLIC POLICY**

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**Abstract.** A paper seeks to justify a need for the better development of sustainable innovative entrepreneurship by public policy initiatives. It takes into account two sides of this issue going from the main challenges of business innovation activity to the possible public policy actions necessary to improve the existing situation. The main focus of this paper is directed on the improvement of current Lithuania’s innovation policy for the more effective business innovation promotion. Moreover, a concept of the innovative entrepreneurship is also discussed here as a foundation of the linkage between innovation and entrepreneurship policies. The research is based on the interpretative, systematic and comparable analysis of the quantitative and qualitative data. The paper provides the results of Lithuania’s innovative enterprises survey performed by the author. The findings include the issues related to the innovative business needs and the role of innovation policy actions in the promotion of this kind of business.

**Keywords:** business innovation, sustainable entrepreneurship, public policy.

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**JEL Classifications:** M21, M29

1. Introduction

It is stated, that the innovation process of the 21st century is radically different to that of the preceding one. The change can be resumed as a shift from the “Managed Economy” to the “Entrepreneurial Economy.” In the former, science and systematic large firm research and development (R&D) was the key. Currently, entrepreneurship is one of the foundations of innovation (OECD 2010).

In recent time a growing number of researchers tend to underline a significance of the entrepreneurship based on innovation activity because of its positive effects at the macro (country; society) and micro (enterprise) levels.

The entrepreneurship is viewed as a critical activity to regenerate and sustain economic growth in strong economies and also as a means of boosting employment and productivity in depressed regions or in developing countries (OECD 2006). Moreover, it is also pointed out, that the growth and job creation effects happen through innovation (OECD 2010) while the entrepreneurship without innovation can only temporary boost the economic growth (Arizona State University 2006).

With regard to economic and social value creation, it is noted, that entrepreneurs who do not innovate do not create wealth (Michael & Pearce 2009, p.290-291). As Peter Drucker (1985) indicated, innovation is a specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. In the meanwhile, Schumpeter (1934, 1939) defined innovation as behaviour and activities, based on destruction of contemporary frames of thoughts and action, which leads to the creation of new goods or quality of goods; development of new methods of production; establishment of new markets; utilization of
new supply sources or; industrial reorganization, and hence breaks with the existing. Audretsch (2006) emphasized an essential entrepreneur's role for the knowledge commercialisation and designated the entrepreneur as the missing link between the knowledge and the innovation (Vinnova & George Washington University 2006).

Thus, it is obvious, that the progressive and sustainable economic development requires efforts not just for business creation, but also for the development of business innovation activity. According to this, an article takes into account a concept of innovative entrepreneurship and discusses a public policy role in business innovation promotion. It is assumed, that a lack of public support to the development of innovative business sector or public policy actions' inefficiency hampers the formation of sustainable innovativeness in the country.

The main objective of this paper is to justify a need for the better development of innovative entrepreneurship by public policy initiatives with the focus on the Lithuania's case. In order to do that, the following goals were defined:

1) To provide a theoretical view on which the concept of innovative entrepreneurship and its role in public policy field is based.
2) To discuss the public policy role in business innovation promotion taking into consideration the strategic facets of current Lithuanian innovation policy.
3) To present the results of recent Lithuania's innovative enterprises survey performed with the aim to investigate the main challenges of business innovation activity in Lithuania as well as the significance of various innovation policy actions in the promotion of this type of activity.

The common research provided in the article is based on the interpretative, systematic and comparable analysis of the quantitative and qualitative data. More specifically, the following research methods were applied in this article:

- Analysis of relevant scientific literature and policy documents in order to: form the common conceptual picture of the innovative entrepreneurship phenomenon; summarize the previous empirical findings in field of business innovation activity; justify the significance of innovative entrepreneurship policy for the promotion of business innovation activity.
- Content analysis of Lithuanian public policy documents used to identify the Lithuania's strategic approach to business innovation promotion.
- Quantitative business survey focused on Lithuania's innovative enterprises (more detailed description of survey's methodology is provided in chapter 3.

The outcomes of this article can be useful for the further improvements of national public policy actions for more effective and sustainable promotion of business innovation activity.

Definitions used in this article:

- Innovation – the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (Oslo Manual 2005, p. 46). A meaning of novelty is understood here from the business or market point of view.
- Business innovation activity is defined here as a complex of creation, development and commercialisation processes of a new or significantly improved products, processes or business organisation forms which brings a higher added value to the market or better performance results inside enterprise. The usage of new knowledge and entrepreneurial skills can be indicated as an anchor of such activity.
- Innovative enterprise is one that has implemented at least one innovation during the period under review, including those with successful, on-going and abandoned innovation activities (Oslo Manual 2005, p. 47, 59).
- Entrepreneurship is explained as a mind-set and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organization (Commission of the European Communities 2003).
- Innovative entrepreneurship is equated with the business innovation activity taking into account a conceptual interface between the innovation and entrepreneurship.

2. Literature review

Concept of Innovative Entrepreneurship

Entrepreneurship is multi-dimensional and can be considered in different contexts, but its importance for economic development and social wellbeing is unquestionable. It is usually related to the following positive effects as: economic growth through new businesses creation; increased competitiveness at
firms and countries levels; employment growth; productivity and unlocked personal potential (Balkienė & Jagminas 2010).

Economists tend to define entrepreneurship from an occupational, a behavioural or an outcomes point of view. From the occupational point of view, entrepreneurs are simply those who are self-employed and/or business owners. Behavioural definitions of entrepreneurship are related to the ‘Schumpeterian’ behavioural view by which entrepreneurship needs to be distinguished from other related activities, such as business ownership, business financing or business management. As it is stated, today many entrepreneurship scholars tend to agree that the defining feature of entrepreneurship is innovation through spotting and utilizing opportunities (Naudé 2011, p. 5-6). From the outcomes perspectives, entrepreneurship is usually examined by its contribution to different parameters of the economic development and quality of life.

The word entrepreneur originates from a 13th-century French verb “entreprendre” meaning “to do something” or “to undertake” (Hall & Sobel 2006). The first time the term of entrepreneurship was defined by the French economist Richard Cantillon in about 1730. He defined entrepreneurship as self-employment of any sort, and entrepreneurs as risk-takers, in the sense that they purchased goods at certain prices in the present to sell at uncertain prices in the future (OECD 2006; Casson 2010, p. 7). Ever since Cantillon’s (posthumous) publication “Essai sur la Nature du Commerce en Général” in 1755, entrepreneurs appeared in economic theory as contributors to society’s economic value (Mirjam Van Praag 1999).

An Austrian American economist Joseph Schumpeter (1934) made a great input to the development of entrepreneurship definition by highlighting a role of the entrepreneur as an innovator. According to Mirjam Van Praag (1999), he turned down the predominant paradigm of entrepreneurship as management of the firm and replaced it with an alternative one: the entrepreneur as leader of the firm and as the innovator and therefore, prime mover of the economic system. Schumpeter was also very clear about what entrepreneurs are: they are not inventors, but people who decide to allocate resources to the exploitation of an invention; they are not risk-bearers: risk-bearing is the function of the capitalist who lends funds to the entrepreneur (Kuper & Kuper 1996, p 428-429).

Baumol (1990) took note of the existence of productive, unproductive and destructive entrepreneurship. That depends on the creation of the wellbeing of society. For Baumol, a productive entrepreneurial activity refers to any activity that contributes directly or indirectly to net output of the economy. An unproductive entrepreneur engages in innovative activity but makes no contribution to the real output of the economy. A destructive entrepreneur engages in innovative activity that leads to the misallocation of valuable resources into pursuits that from the viewpoint of the economy are useless and are carried out for the self-serving purposes of the entrepreneur (Baumol 1993).

Drucker (2002, p. 95) said that the term entrepreneurship refers not to an enterprise’s size or age but to a certain kind of activity. At the heart of that activity is innovation: the effort to create purposeful, focused change in an enterprise’s economic or social potential.

Blakemore (2006) took into consideration an impact of replicative and innovative entrepreneurs on economic growth. Innovative entrepreneurs create and commercialize new products, services and business practices, in contrast to the replicative entrepreneurs – those who open businesses that support a growing population Blakemore highlighted, that entrepreneurship without innovation can only temporary have a positive effect, while the long-term economic growth requires innovation (Arizona State University 2006).

Stam (2008) took notice of the following necessary conditions under which the concept of entrepreneurship is defined: 1) existence of entrepreneurial opportunities (environmental changes: technological, political/regulatory, social/demographic); 2) difference between people (in their willingness and ability to act upon an opportunity); 3) risk bearing, uncertainty until the entrepreneur pursues the opportunity; 4) organizing (new way of exploiting the opportunity); 5) innovation: recombination of resources into a new form that is by implication not a perfect imitation of what has been done before, and thus involves a change in the marketplace.

The different concepts of entrepreneurship and their links with innovation are provided in table 1.
Table 1. Evolution of entrepreneurship concept

<table>
<thead>
<tr>
<th>Source</th>
<th>Concept of Entrepreneurship</th>
<th>Reference to innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific sources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantillon (1730)</td>
<td>Any kind of self-employment</td>
<td>-</td>
</tr>
<tr>
<td>Schumpeter (1934)</td>
<td>Activity based on purposeful and systematic innovation.</td>
<td>+</td>
</tr>
<tr>
<td>Kirzner (1973)</td>
<td>Equilibrating force in which entrepreneurs discover previously unnoticed profit opportunities and act on them</td>
<td>-</td>
</tr>
<tr>
<td>Wennekers and Thurik (1999)</td>
<td>Manifest ability and willingness of individuals, on their own, in teams, within and outside existing organizations, to: (i) perceive and create new economic opportunities (new products, new production methods, new organizational schemes and new product market combinations); and (ii) introduce their ideas in the market, in the face of uncertainty and other obstacles, by making decisions on location, form and the use of resources and institutions</td>
<td>+</td>
</tr>
<tr>
<td>Drucker (2002)</td>
<td>Certain kind of activity focused on innovation</td>
<td>+</td>
</tr>
<tr>
<td>Shane (2003)</td>
<td>Activity that involves discovery, evaluation and exploitation of opportunities to introduce new goods and services, ways of organizing, markets, processes, and raw materials through organizing efforts that previously had not existed</td>
<td>+</td>
</tr>
<tr>
<td>Stam (2008)</td>
<td>Introduction of new economic activity by an individual that leads to change in the marketplace, taking into account the necessary conditions for entrepreneurship, one of which is innovation.</td>
<td>+</td>
</tr>
<tr>
<td><strong>Policy documents and other sources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>European Commission (1998)</td>
<td>Dynamic process by which individuals constantly identify economic opportunities and act upon them by developing, producing and selling goods and services</td>
<td>-</td>
</tr>
<tr>
<td>European Commission (2003)</td>
<td>Mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation</td>
<td>+</td>
</tr>
<tr>
<td>United Nations (2004)</td>
<td>Source of innovation and change, and as such spurs improvements in productivity and economic competitiveness</td>
<td>+</td>
</tr>
<tr>
<td>OECD (2005)</td>
<td>An action, process, or activity, in which creativity, risk-taking and innovation play a significant role</td>
<td>+</td>
</tr>
<tr>
<td>OECD (2007)</td>
<td>The phenomenon associated with entrepreneurial activity, which is described as the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets</td>
<td>+</td>
</tr>
<tr>
<td>Encyclopedia of Business in Today's World (2009)</td>
<td>Practice of starting a business or “breathing life” into an existing business</td>
<td>-</td>
</tr>
<tr>
<td>Global Entrepreneurship Monitor (2012)</td>
<td>Any attempt at new business or new venture creation, such as self-employment, a new business organisation, or the expansion of an existing business, by an individual, a team of individuals, or an established business</td>
<td>-</td>
</tr>
</tbody>
</table>

*Source: formed by author*

As it is seen, on the one hand, a number of the scientific sources and policy documents relate the concept of entrepreneurship to the creation and development of new businesses. However, on the other hand, most of them (Schumpeter 1934; Baumol 1968; Drucker 1985; et al.) also highlight a role of entrepreneur as an innovator, who is able to find and exploit the new opportunities, to take a risk and transform the new knowledge into practice.

Thus, there is a two-sided conceptual issue which needs to be more deeply considered: Could the entrepreneurship be seen just as an economic activity with the aim to crate and/or develop business without the focus on novelty as it is described in the concept of innovation? Or should it be directly related to the innovation activity? What is different between traditional business activity and entrepreneurship?
Audretsch (2006) noted, that entrepreneurial model of doing business is about taking a new idea, typically based on new knowledge, and turning it into a high growth firm. He indicated the following features of entrepreneurship model: new emerging sectors; high R&D; high human capital; high wages; turbulence; new sources of finance; high growth (Vinnova & George Washington University 2006).

Lindholm (2006) distinguished between small firms and entrepreneurial firms pointing out, that a lot of entrepreneurial firms are small, but that is not always the same thing. By saying this, she gave reference to the public policy actions what sometimes have not equal influence on SMEs and entrepreneurship (Vinnova & George Washington University 2006).

Stam (2008) pointed out two important disclaimers concerning the measurement (not everything that is counted as entrepreneurship concerns innovation) and systemic effects (more entrepreneurship does not always mean more economic growth) of entrepreneurship, what should be considered by innovation policy makers.

Thus, taking into account all the scientific and political discussions provided above, this paper emphasizes the concept of innovative entrepreneurship, which clearly indicates the business innovation activity as a core element within the concept of entrepreneurship. The differences identified between entrepreneurial and innovativeentrepreneurships are provided in the table below (table 2).

### Table 2. Entrepreneurship vs. Innovative entrepreneurship

<table>
<thead>
<tr>
<th>Features</th>
<th>Entrepreneurship</th>
<th>Innovative entrepreneurship</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Knowledge</td>
<td>• Usage of existing knowledge</td>
<td>• Usage of new knowledge or new ways to apply the existing knowledge</td>
</tr>
<tr>
<td>• Competences</td>
<td>• Business competences</td>
<td>• To innovation oriented competences and creativity</td>
</tr>
<tr>
<td>• Culture</td>
<td>• Entrepreneurial culture</td>
<td>• Innovation culture</td>
</tr>
<tr>
<td>• Science</td>
<td>• Traditional activity without R&amp;D</td>
<td>• R&amp;D activity and R&amp;D personnel</td>
</tr>
<tr>
<td>• Financing</td>
<td>• Traditional sources of financing</td>
<td>• New sources of financing</td>
</tr>
<tr>
<td>Focus</td>
<td>Successful practice; market’s habits</td>
<td>Commercialisation of novelty</td>
</tr>
<tr>
<td>Effect</td>
<td>Self-employment; job creation</td>
<td>Progressive development of economy and society</td>
</tr>
<tr>
<td>Definition</td>
<td>Business activity based on replication of already existing one in the new or existing enterprise</td>
<td>Business activity based on the new knowledge and/or R&amp;D results, and their implementation in the form of the new products or processes</td>
</tr>
</tbody>
</table>

*Source: formed by author*

Some sources of the literature (Lundström & Stevenson 2005; Dahlstrand & Stevenson 2007, 2010) relate the concept of innovative entrepreneurship to technological companies or high growth companies. However, according to the definition of innovation, this paper suggests associating the innovative entrepreneurship with business innovation activity without distinction between its technological or non-technological nature.

It can be assumed, that an application of the concept of innovative entrepreneurship in public policy area could contribute significantly to the purposeful and systemic approach based efforts for the sustainable development of favourable conditions for business innovation activity. Moreover, in respect of innovation role, the usage of the concept of innovative entrepreneurship would narrow the interpretations of entrepreneurship's phenomenon down.

Thus, with regard to what was mentioned before, the further sections of this article will be focused on the business innovation related issues.

**Previous Empirical Researches on Business Innovation Activity**

In recent time a growing popularity of innovation related surveys can be observed. In the business innovation surveys’ area, a great focus on innovative SMEs is seen. The most common issues analysed include: the role and sources of innovation; factors influencing business innovation activity; innovation impact on business performance results; innovation capacities; government’s role in business innovation promotion; etc. A short review of previous researches
concerned with business innovation activity is provided below.

Lundström & Stevenson (2005, p. 144, 146), analysing the government practice of different countries in the business innovation promotion, indicated a number of barriers inhibiting the development of innovative new firms: intellectual property issues, lack of adequate premises, lack of pre-seed developmental and early-stage equity financing, lack of entrepreneurial and management skills, lack of interaction effects between possible innovations and potential entrepreneurs and lack of a dynamic environment to stimulate overall entrepreneurial activity. They also stated that evidence exists to support the idea that innovative entrepreneurship is likely to be more effective in environments where entrepreneurship is highly valued and supported by society.

McAdam, Reid, Harris and Mitchell (2008) conducted an empirical study of innovation incorporation in SMEs as a key sustainable source of competitive advantage, by controlling for key technological and organisational determinants. The survey's results are based on the investigation of 2086 UK SMEs. Authors found that innovation was most strongly related to government grant aid, firm size, industrial sector, and the approach taken by the firm to organise how it develops products and processes.

Oksanen and Rilla (2009) analysed the role of innovation in small Finnish entrepreneurial firms. The study was based on a questionnaire survey (220 Finnish companies having introduced an innovation to market in 1999-2004) and semi-structured interviews (70 Finnish innovative SMEs). According to the survey results, innovation is a crucial factor for existence of business. An identification of market niche and customer needs identified as the most important source for innovation among companies. Increase in profitability and competitiveness emerged as the most beneficial impacts of innovation in all companies but also new contacts and co-operation that arise in the process of innovative activity were highly valued, especially in micro firms.

Chamberlin, Doutriaux and Hector (2010) explored the relationship between innovation and various business success factors in 3701 firms across 34 Canadian service sectors. The findings confirmed that innovative firms are more likely to develop their human talent, to actively manage their organisational knowledge and adopt new technologies than non-innovative firms, while non-innovative firms are more likely than innovative firms to identify proximity to clients and suppliers.

Jørgensen and Ulhøi (2010) investigated how firms develop their innovation capacity through network participation. The results have shown that the network relationships formed during the earliest stages of the firm's life cycle played a critical role in developing the SME's capacity for sustained innovation.

Kaufmann, Tsangar and Vrontis (2012) studied the existing hurdles for innovation and the level of systematic application of different management functions relevant for innovation management in 204 European SMEs. The research performed in six European countries (United Kingdom (30 SMEs), Cyprus (30), Spain (28), Italy (30), Greece (23: Thessaloniki; 33: Athens), Lithuania (30)) resulted in the following major findings:

- The two major reasons blocking innovation are lack of money and lack of time, while the lack of money was strongest perceived in Italy, Greece and Lithuania.
- The factors that significantly lead to successful innovation, in order of importance, are: 1) Corporate culture; 2) If the company has a department of innovation or a formal process for innovation; 3) The number of employees, i.e. the size of the company (the more employees the higher the level of innovation); 4) whether existing products, even successful ones, get reviewed from time to time.
- Very low level of SME co-operation with universities in all six countries found: 62.2% of all companies do not co-operate with universities in terms of innovation.
- Better technology, new market opportunities and customers’ requirements were perceived by all companies as reasons for improvements.
- New product ideas come from owners, what showed a contradiction between the awareness of the importance of customer requirements and the actual involvement of customers in the innovation and creativity process.
- Companies prefer more incremental rather than radical product changes.
- SMEs do not feel to be supported by governments as to innovation activities. The reasons for this perception were suggested to be subject for further research.

At national level some authors also performed to the
business innovation activity oriented surveys.

Tvaronavičienė and Korsakienė (2007, 2008) explored an approach of 1264 Lithuanian companies towards innovations, taking into account the economic conditions and public policy. The survey revealed the limited government role in innovation promotion: business companies did not feel the effects of active state policy for innovation promotion and were not aware of state and other external available sources of financing. The authors also indicated the weak relationships between business companies and scientific institutions, what was emphasized as one of the factors impacting low value added innovations developed without input from the R&D sector.

Masiulis, Sudnickas et al. (2009) measured an impact of innovation policy on the SMEs development in Vilnius region (Lithuania). The SMEs indicated that innovation policy in Vilnius region is not properly implemented. The financial support and support for R&D activity was perceived as the most important areas for SMEs, while an establishment of business incubators and technology transfer centres was the least significant. There was also denoted a weak cooperation between SMEs and public administration institution.

Baležentis and Žalimaitė (2011) conducted the research aiming to identify the innovation development factors in Lithuania. The results, reflecting an opinion of 7 Lithuania’s innovative companies, indicate the following factors hindering the business innovation activity: financing problems as the high innovation costs; lack of creative and skilled personnel; and motivation problems. According to the companies interviewed, the main factors influencing the slow innovation development in Lithuania include: insufficient collaboration between business and science; and focus on low-value-added products and services.


- Types of innovation introduced by the companies in the EU:
  - 2007: Goods-related innovation is the type that’s the most widespread across the EU, while the service innovation are less frequently reported. At the same time the least widespread innovation activity of companies is application for patents.
  - 2013: Companies are most likely to have introduced new or significantly improved products, services, or processes than other innovation forms (organisational, managerial, marketing innovations) between 2009 and 2011.

- Reasons and incentives for innovation activity (by order of importance):
  - 2001: 1) the desire to build up market shares and company profitability; 2) a wish to preserve the independence of the company; 3) the desire to create jobs; 4) compliance with environmental standards.
  - 2003: 1) consumers’ needs; 2) increasing price competition; 3-4) need to improve the productivity level of personnel as well as need to improve the efficiency of machinery and equipment; 5) increasing product competition; 6) response to new regulatory or legislative obligations.
  - 2009: 1) increased pressure from competitors; 2-3) increased demand from existing commercial clients as well as the new opportunities to expand within existing markets or enter new ones.

- Contributors to companies’ strengths in innovation (by order of importance):
  - 2002: 1) qualifications and professionalism of staff; 2) good co-operation with suppliers, customers or trade associations; 3) flexibility and adaptability of production to market needs; 4) efficient production methods making best use of resources; 5) leadership in finding out and exploiting new market trends; 5) technological advance and R&D competencies.

- Companies’ unsatisfied needs for innovation (by order of importance):
  - 2001, 2002: 1) accessing innovative customers and/or markets; 2) finding or mobilising human resources; 3) financial resources; 3) finding and using new technologies; 4) knowledge sharing or networking; 5) protecting knowledge.

- Networking and cooperation of innovative companies:
  - 2002, 2003: The innovative companies would preferably seek advice from private external consultants or most likely from their suppliers or customers for introducing of new management approaches than from research institutions or public advisory centres.
  - 2004: The proportion of enterprises which confirmed their participation in the innovation networks including other firms, universities or research insti-
Kristina Balkienė
Sustainable innovativeness: issues and public policy

In general, the areas of previous researches related to business innovation activity vary widely. However, they can be divided into the two main groups: 1) researches concerned with business internal environment and actions (issues at micro level); and 2) researches oriented to the external factors influencing business innovation activity including political, economic, social and technological aspects (issues at macro level).

Additionally, it is important to note, that the scientific papers referring to the promotions of innovative entrepreneurship are still rare. Moreover, the public policy actions and their impact on business innovation activity are mainly investigated by request of public institutions and organisations (i.e. initiated by the European Commission, the OECD, the United Nations, national governments, etc.).

From Innovation Policy to the Innovative Entrepreneurship Policy

In the emerging market economies (countries in transition) the sustained economic growth based on the use of innovation has come forward as the major objective of government policy. In countries rich in resources, decision makers have increasingly realized that economic development based on their exports is hardly sustainable given the volatility of external market demand and prices. In other countries, poor in natural resources, there has been no alternative to innovation-based development since the start of transition (United Nations 2012). Thus, this justifies an important role of national innovation policies for the development of sustainable innovativeness ensuring higher economic and social value creation and future prosperity.

Going back to the history, it is stated, that innovation policy was developed on a basis of science and technology policy and industrial policy, and its appearance signalled a growing recognition that knowledge in all its forms plays a crucial role in economic progress (Oslo Manual 1996). Some sources relate an explicit formulation of innovation policy to the 1960s (Aubert 2004), others indicate, that the “Innovation” was only beginning to emerge as a policy area in 2000-2001 (Lundström & Stevenson 2005, p. 123).

Taking into account the broad understanding of innovation and its different factors of influence, the innovation policy can be defined as the public policy initiatives and actions implementing with the aim to foster the development of innovation activity both at macro (country; society) and micro (enterprise) levels.

According to the analysis of EU strategic priorities for innovation development in period from 1993 to present-days, the following main areas of public policy actions are identified:

- Innovation and entrepreneurship culture (educa-
In the meanwhile, the innovation policy instruments and measures include those to: increase basic research and R&D investments; facilitate collaboration between enterprises and other actors to promote joint innovation activities and knowledge exchanges and foster spin-offs firms (e.g., cluster networks); support innovation infrastructure, such as technology transfer offices, science parks, and business / technology incubators; encourage the uptake of strategic technologies among SMEs; promote an increase in the percentage of science and engineering graduates; improve the intellectual property rights regime; improve access to pre-commercialization funding and venture capital; provide tax and other incentives and supports to accelerate the commercialization of new technologies and products (Lindholm & Stevenson 2007, 2010).

However, in regard to business innovation promotion, a link between innovation and entrepreneurship policies should be highlighted here. One the one hand, it is obvious, that the promotion of business innovation activity requires favourable conditions for the business development in general (business development and entrepreneurship policies), including legislative and regulatory system, entrepreneurial culture, business skills ensuring education and training system, etc. But, on the other hand, the specific focus areas (e.g. science and R&D activity; specific innovative business support infrastructure; innovation oriented competences; funding sources for innovation; etc. (innovation policy)) essential for the innovative business activity should be taken into consideration properly. Agreeably to this, the table 3 presents the differences between public policies concerned with the entrepreneurs and innovative entrepreneurs.

Table 3. Differences between public policies for entrepreneurs and innovative entrepreneurs

<table>
<thead>
<tr>
<th>Policy features</th>
<th>Entrepreneurs</th>
<th>Innovative entrepreneurs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rationale for policy</strong></td>
<td>Job creation, social inclusion, diversity; gender equity</td>
<td>Wealth creation; innovation; creation of value from R&amp;D</td>
</tr>
<tr>
<td><strong>Basis of demographic selection</strong></td>
<td>Groups with lower than national average self-employment or business ownership rates</td>
<td>People with post-secondary educations; working in postsecondary educational environments (graduates, researchers, technologists)</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td>Develop entrepreneurial potential; increase start-up rates</td>
<td>Stimulate innovative start-ups; foster development of high-growth potential firms</td>
</tr>
<tr>
<td><strong>Dominant policy areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Financing</strong></td>
<td>Micro loan programmes; loan guarantee schemes</td>
<td>Equity financing schemes (pre-seed funds, angels, venture capital)</td>
</tr>
<tr>
<td><strong>Support Infrastructure</strong></td>
<td>Dedicated enterprise centres/agencies</td>
<td>Technology incubators/ innovation centres</td>
</tr>
<tr>
<td><strong>Business support measures</strong></td>
<td>Advice and counselling</td>
<td>Technical assistance and consulting</td>
</tr>
<tr>
<td><strong>Regulatory issues</strong></td>
<td>Government procurement set-asides</td>
<td>Review of intellectual property rules; simplification of patenting laws and procedures</td>
</tr>
<tr>
<td><strong>Networks</strong></td>
<td>Support for formation of entrepreneur associations</td>
<td>Support for cluster networks; networks of high-growth firms</td>
</tr>
<tr>
<td><strong>Skills development</strong></td>
<td>Self-employment training</td>
<td>Entrepreneurial skills, business development support</td>
</tr>
</tbody>
</table>

*Source: Lundström & Stevenson 2005, p. 124*
As a source of the United Nations (2012) states, the business climate in which the innovation-based enterprises operate is influenced by the following factors: the scope of R&D, which determines the stock of inventions and innovations to be commercialized; the quantity and quality of human resources available for R&D; regulatory and institutional environment conducive to innovation, including stable property rights; transparent and simple rules, and low costs governing the registration and operation of enterprises; intensity of linkages between the various actors involved in innovation; openness to foreign technologies and to cross-border cooperation in innovation; and the wide use of information and communication technologies.

Thus, in accordance with information provided above, it can be stated, that the link and differences between the innovation and entrepreneurship policies serve as a precondition for the application of the term of innovative entrepreneurship policy (conceptual view provided in picture 1).

Summing up, it is necessary to highlight, that the emphasized concept of innovative entrepreneurship policy is based on the requirement to perceive the promotion of business innovation activity in the systemic and complex way, where interaction between innovation and entrepreneurship policies ensures the purposeful and comprehensive implementation of public policy actions for the productive and sustainable innovation development.

As Audretsch (2004) noted, an important new direction for public policy to promote innovation and economic growth involves instruments promoting entrepreneurship. Future research needs to explicitly identify what exactly those instruments are and how public policy can best be deployed to promote innovative entrepreneurship (Audretsch 2004; Lindholm & Stevenson 2007, 2010).

3. Methods and Methodology of Empirical Survey

Lithuania’s innovative enterprises survey was initiated in order to identify the main challenges of business innovation activity in Lithuania as well as the significance of various innovation policy actions in the promotion of this type of activity. In order to do that, the survey investigated:

- A range of the reason for innovation activity in business sector (Why do Lithuanian enterprises perform the innovation activity?);
- The main challenges perceived by the enterprises in their innovation activity (With what obstacles do the innovative enterprises face when they perform the innovation activity in Lithuania?);
- The needs of Lithuania’s innovative enterprises with regards of public policy initiatives for business innovation promotion (In what fields of actions should the public policy intervene in order to help companies to develop their innovation activity?);
- A significance of existing and other possible innovation policy actions for business innovation activity in Lithuania (How the Lithuania’s innovative enterprises assess the different public policy initiatives in terms of their innovation activity?).

As it was mentioned in the beginning of this article, the empirical research was performed by using quantitative research data collection method – the quantitative business survey. The empirical data were collected between 29th May and 8th July 2013 by using a structured online questionnaire (a structure of the questionnaire is provided in table 4).
A content of the questionnaire was designed according to: (1) the results of international innovation experts’ survey performed by the author in the second part of 2012; (2) the analysis of policy measures included in the Lithuanian Innovation Strategy Implementation Plan for 2010–2013; (3) the review of scientific literature on business innovation activity.

The survey sample formed from all the Lithuania’s innovative enterprises that met at least one of the following criteria (in total: 303 enterprises were invited to participate in the survey):
- Company is included in the catalogue of innovative companies operating in Lithuania “Gateway to Innovation in Lithuania” (http://www.inovacijos.lt/gate2inno/); or
- Company got the Innovation Award in the period 2005–2012 (all the Lithuania’s innovative companies awarded are announced here http://www.inovaciju-prizas.lt/).

The invitations to participate in the survey, including the link to the online questionnaire, were distributed among companies electronically by using their e-mail addresses (a preference was given to the contact details of companies’ managers or owners).

The factual sample consisted of 84 Lithuania’s innovative companies that filled the survey’s questionnaire (a response rate is 27%).

However, despite the low number of companies agreed to participate in the survey, the findings obtained are considered as valuable taking into account the fact that all enterprises were included in the sample by the same categorization criteria of innovativeness. Additionally, it is important to note, that this survey does not seek to reflect the opinion of all Lithuanian companies and is only related to those companies, which were indicated as innovative. Thus, this survey can be considered as pilot research requiring additional time and financial resources to ensure its continuity by complementary research data collection methods.

4. Findings

Review of National Innovation Policy: Challenges, Current Strategic View and Actions

The innovation activity in Lithuania still needs to be enhanced considerably. Lithuania lags behind almost all the EU countries by the Summary Innovation Index (23th place out of 27) announced annually by the European Commission (Innovation Union Scoreboard 2013) for the evaluation of countries’ innovation performance results. According to this and other international innovation assessment tools (i.e. Summary Innovation Index (SII); Global Innovation Index (GII); Global Competitiveness Index (GCI)), Lithuania’s innovation strengths are usually related only to an education of human resources and the information and communication technologies, while the following areas of weaknesses talk about the requirement to strengthen public policy efforts (European Commission 2013; Cornell University & INSEAD & WIPO 2013; Schwab 2012):
- Business R&D expenditure (SII; GII; GCI) (this can be named as one of the biggest challenges in terms of business innovation activity: in 2011 the R&D expenditure in Lithuania’s business enterprise sector was only 0.24% of GDP, while at the same time the EU27 average accounted for 1.26% (Eurostat 2011));
- SMEs innovation activity (SII);
- Intellectual assets including different forms of intellectual property rights (SII; GII);
- Quality of science and research systems, taking into account the scientific outputs (SII; GII);
- Funding opportunities, including affordability of financial services, ease of access to loans (GCI) as well as venture capital availability (GCI, GII);
Collaboration networks in regard to the state of cluster development (GCI, GII).

Thus, in order to better react to innovation related challenges and to ensure more effective development of innovative economy and society Lithuania has approved its first Innovation strategy for 2010–2020. This strategy highlighted a need to implement a horizontal approach based policy for more effective development of innovative economy and society in Lithuania. The following four priorities of innovation policy actions were determined: 1) acceleration of Lithuania’s integration into the global market; 2) education of a creative and innovative society; 3) development of broad-based innovation; and 4) implementation of a systematic approach to innovation (Government of the Republic of Lithuania 2010). The full picture of current Lithuanian innovation policy, including the main objective, priority areas and goals, is presented in figure 2.

![Creative Society and Favorable Conditions for the Development of Entrepreneurship and Innovation](image)

**Figure 2.** Current National Innovation Development Framework

*Source: Baležentis & Balkienė 2011*

However, in the context of this article, it is important to discuss the Lithuanian strategic approach to business innovation promotion. From this point of view, it can be stated, that Lithuanian innovation policy initiatives are not sufficient. An analysis of current innovation policy measures included in the Lithuanian Innovation Strategy Implementation Plan for 2010–2013 showed, that only 18% of all strategy’s measures (i.e. 21 out of 119) are directly oriented to business needs, including those that are concerned with business innovation activity (i.e. 11 out of 21). By the nature these measures encompass: 15 measures focused on financial support to various business related activities (clusterization; R&D projects and infrastructure; internationalization; protection of intellectual property rights; etc.); 2 measures directed to business and science cooperation (researchers employment in SMEs; innovation vouchers scheme); and 4 measures for education and information services (dissemination of information; trainings) (Balkienė 2013).

In terms of financing, around 716 million euros (only 30% of total funding for all strategy’s actions) planned to the implementation of these business related measures, where the main source of funding is the EU structural funds (Balkienė 2013).

In conclusion, there should be emphasized a need to strengthen the national efforts for faster and more effective promotion of business innovation activity in Lithuania. It is essential in order to ensure the progressive and sustainable development of national economy as well as the better living conditions for whole society.
Results of Lithuania’s Innovative Enterprises Survey

Part I. Information about company’s innovation activity

In order to know how Lithuania’s innovative companies vary by their innovation activities, the respondents were asked to identify a nature of their innovation activity. According to the results (figure 3), around half of all companies (47%) performed the innovation activity oriented to manufacture of the new or significantly improved products, while the innovative service sector was represented only by 15% of enterprises interviewed. It is important to note, that the majority of respondents indicated more than one kind of innovation activity.

![Figure 3. Distribution of the companies by types of innovation activity](image)

Analysing the duration of companies’ innovation activity, it is seen that 74% of them performed the innovation longer than 3 years, 12% of which implemented the innovation based activities more than 10 years (figure 4). As the main reasons for companies to be involved in innovation activities were indicated the following wishes to: respond to the market needs; increase company’s profitability; improve the products’ quality; and increase the market share (figure 5). These results justify the innovation motives indicated by different literature (e.g. Oslo Manual 1996). However, the companies’ orientation to social and public interests, such as the development of environmentally friendly products, job creation or improvement of working conditions, is poorly expressed.

![Figure 4. Distribution of the companies by duration of their innovation activity](image)
Further in this survey the main obstacles for business innovation activity in Lithuania were investigated. A list of factors, that impede the innovation activity, was formed according to the findings of international experts’ survey previously carried out by the author. The results show that companies have the same experience based opinion on the innovation obstacles provided, what at the same time confirms the information obtained by the former research. Despite the fact that all factors provided in the list were indicated as hindering the companies’ innovation activity (figure 6), the major obstacles for business innovation in Lithuania include (as a big obstacle indicated by more than 50% of all respondents): 1) lack of financial instruments for business innovation promotion; 2) lack of financial resources; 3) market related obstacles (e.g. limited demand; non-transparent competition; etc.); 4) limited external collaboration; 5) cultural obstacles (e.g. lack of risk tolerance; weak innovation culture; lack of trust; etc.).

In the meanwhile, a lack of high skilled employees in the company as well as in the labour market, and the limited technological possibilities were marked as more neutral than negative factors.
In regards to public support for innovation, the Lithuania’s innovative companies indicated the following key areas in which government should take initiatives: 1) better communication between business and policy makers; 2) more collaboration opportunities; 3) improvement of business legal and regulatory environment; 4) financial support for innovation projects (figure 7).

**Figure 7.** The main areas in which government should take initiatives for better support of companies’ innovation activity

Agreeably to survey’s results, it should be noted here, that the collaboration related issues play a very important role in the companies’ innovation activity: a limited external collaboration was identified as one of the major challenges for companies to innovate; the collaboration opportunities underlined as a second priority area of government actions for business innovation promotion; and all the companies interviewed had at least one kind of partnerships for the innovation purposes (figure 8).

**Figure 8.** Distribution of companies by their collaboration partners
Part II. Information about the significance of public policy for company's innovation activity

In this part of survey, an attempt was made to evaluate the innovative companies’ needs for different types of policy actions.

First of all, the significance of various innovation promotion initiatives pointed out by innovation experts in former research was investigated (figure 9).

According to more than 70% of all respondents, the most significant public policy initiatives for business innovation promotion are: 1) easy to apply R&D funding schemes; 2) tax reliefs for business innovation related activities; and 3) actions related to red tape reduction for business.

In addition to initiatives mentioned above, the following policy actions were also perceived by Lithuanian companies as having significant role for business innovation activity: funding not only for research but also for prototyping, testing and demonstration activities; dissemination of information relevant to innovation activity; decisions based on the communication with business; science orientation to business needs (e.g. industrial PhD studies; orientation of R&D activities to the future needs; researchers mobility and internships in business sector; etc.); continuity and consistency of strategic priorities for inno-

Figure 9. The significance of various public policy initiatives for business innovation activity
oration; support for business and science cooperation. At the same time, a focus on regions was indicated as the least significant policy initiative for innovation (marked by 50% of all respondents). However, this can be explained by the geographical distribution of companies interviewed: the majority of innovative companies were based in the five biggest cities of Lithuania (i.e., Vilnius, Kaunas, Klaipėda, Šiauliai, Panevėžys).

In order to assess the national policy actions for business innovation promotion, the companies were asked to share their opinion on the significance of current Lithuanian innovation policy in terms of their innovation activity. The results show, that only 12% of all Lithuania’s innovative companies think that current innovation policy is beneficial to them (figure 10). This clearly justifies a need to better focus the national policy efforts on business innovation promotion.

![Graph](image)

**Figure 10.** Usefulness of current innovation policy for companies’ innovation activity

Moreover, in regards to concrete national innovation policy actions, the survey investigated the companies’ attitudes towards current Lithuanian innovation strategy implementation measures (figure 11). The findings demonstrate that the most significant measures for companies’ innovation activity are (indicated by more than 60% of all respondents): the funding for business R&D projects and public support services for business (i.e. dissemination of information relevant to business activity; various trainings; assistance in finding the cooperation partners; etc.).
In your opinion, how significant are the following Lithuanian innovation strategy implementation measures for your company’s innovation activity?

- Implementation of financial instrument “SMEs venture capital funds”
- Promotion of business and science cooperation through researchers employment in SMEs
- Support for business incubation activities
- Implementation of financial instrument “SMEs credits”
- SMEs loans compensation
- Funding for SMEs technological innovation projects
- Funding for business start-up and development
- Financial support for innovative clusters projects
- Funding for business R&D infrastructure projects
- Financial support for the protection of intellectual property rights
- Funding for the promotion of companies internationality
- Promotion of business and science cooperation through Innovation vouchers scheme
- Public support services for business
- Funding for business R&D projects

![Figure 11. The significance of Lithuanian innovation strategy implementation measures for companies’ innovation activity](image)

In the meanwhile, the majority of measures which have been designated as insignificant belong to the SMEs oriented actions’ field. Knowing that more than 90 per cent of all companies participated in the survey were SMEs, these data should be taken into account properly. The two most likely preconditions can be made here: (i) the SMEs interviewed have a lack of relevant information; or/and (ii) an access to SMEs oriented innovation policy tools is too difficult regarding the complicated administrative procedures and bureaucratic requirements. However, a verification of these preconditions requires further researches.

Part III. Information about company and respondent

The survey’s data show that the majority of respondents (84%) were responsible for companies’ management functions, including the top level managers (26%), managers in specific areas (45%) and business owners (13%). Other part of respondents indicated themselves as the specialists.

By legal status, 82% of all companies interviewed were private limited companies (figure 12) and the majority of them had less than 250 employees (i.e. 93% of all innovative companies participated in the survey were SMEs) (figure 13). However, by business sector the Lithuania’s innovative companies varied significantly and only the ICT sector was represented by 20% of companies interviewed (figure 14).
Figure 12. Legal status of the companies interviewed

Figure 13. Number of employees in the companies interviewed

Figure 14. Distribution of companies interviewed by field of their activity
Summarising, it can be stated, that the promotion of business innovation activity in Lithuania should become a clearly explicit priority, while the improvement of existing innovation policy actions should be based on the real business challenges and needs.

5. Discussion and Implications

As it is stated, the innovation and entrepreneurship policies are both relatively recent as distinct policy areas, and therefore seldom integrated in the most countries. However, according to Lindholm and Stevenson (2007), for innovative entrepreneurship to be able to fully contribute to economic growth and development, its importance needs to be further acknowledged in innovation as well as entrepreneurship policies.

Additionally to these statements, the findings obtained from the international experts’ survey performed previously by the author can be mentioned here. The innovation experts from six countries were asked to share their opinion about the need to integrate the innovation and entrepreneurship policies/determine the joint initiatives and actions for business innovation promotion. The majority (72%) of all innovation experts confirmed that innovation and entrepreneurship policies should be better interlinked (figure 15 and 16).

The experts, who agreed that innovation and entrepreneurship policies should be related for better business innovation promotion, also indicated the arguments, justifying their views, which have been systematized into table 5.

![Figure 15](image1.png)

**Figure 15.** A need to integrate the innovation and entrepreneurship policies (% of all experts)

*Source: formed by author according to the data of experts’ survey performed in 2012*

![Figure 16](image2.png)

**Figure 16.** Distribution of experts who indicated the need to integrate the innovation and entrepreneurship policies (by number and countries of origin)

*Source: formed by author according to the data of experts’ survey performed in 2012*
Thus, taking into account all the information provided, the public policy actions directed to better integration of innovation and entrepreneurship policies could lead to the more effective promotion of business innovation activity.

However, from the traditional business perspectives, there are still many doubts on the advantages of innovative entrepreneurship policy. Therefore, it is important to note, that this paper does not argue about the need to develop the better general conditions for business to flourish, but highlights an idea of innovative entrepreneurship policy as the precondition for more effective public support to innovation oriented business, which always needs both: the general favourable environment for business start-up and development, and special conditions fostering their innovation based activities.

Table 5. Foundation of the innovation and entrepreneurship policies integration

<table>
<thead>
<tr>
<th>Need</th>
<th>Focus areas of integration</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Innovation and entrepreneurship as closely interlinked elements should become the integrated part of education system</td>
<td>- Education system - Innovation schemes - To entrepreneurship oriented trainings - Funding optimization - Responsibility and Coordination - Collaboration - Continuity and consistency of policy actions - Business orientation to innovation activity</td>
<td>- More efficient development of entrepreneurship and innovation culture - Better business orientation to activity based on innovation (motivation and support) - Economical use of resources, including finance - Better coordination of policies implementation - Cooperation and liaison between different elements of innovative entrepreneurship - Better focus on entrepreneurship promotion than on just business development</td>
</tr>
<tr>
<td>- Entrepreneurship is often related to start-ups, but this type of companies is usually also innovative companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Business without innovation will not be able to respond to market’s needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Lithuania does not have institution responsible for entrepreneurship policy implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Lithuanian innovation and entrepreneurship policies are currently disconnected</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: formed by author on the basis of experts’ survey performed in 2012

6. Concluding Observations

This paper makes a contribution to the literature discussing the innovation and entrepreneurship related issues from the business innovation promotion point of view. The issues analysed serve as the preconditions for the formation of sustainable innovative entrepreneurship policy.

The number of empirical findings presented in this article leads to the final conclusion highlighting an unquestionable requirement to strengthen national public policy actions for the more effective and sustainable business innovation promotion in Lithuania. In order to improve the existing situation, better attention should be paid to the real challenges and needs of innovative business sector, taking into account the great importance of bilateral-goals-based communication between business, science and government. Thus, the development of sustainable innovativeness requires not only formal implementation of public policy actions, but also calls for the long-term strategic view clearly showing business role in building progressive and competitive economy.

From the perspectives of future researches, the following facets of business innovation promotion could be investigated: an effectiveness of national innovation policy measures in terms of their impact on various business performance results; the arguments justifying the usefulness/uselessness of separate innovation policy actions for the development of business innovation activity; the challenges of innovative business with regards to public support received; a role of sustainability in the content of national innovation policy and its impact on business orientation to sustainable innovation.

References


Kristina Balkienė
Sustainable innovativeness: issues and public policy


ENERGY INTENSITY IN THE LITHUANIAN MANUFACTURING SECTOR

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Abstract. There is major concern with Lithuania’s industrial development because its manufacturing structure is increasingly dependent on the consumption of energy. In spite of the Lithuanian energy intensity decrease more than 35 percent in the last decade, the energy required to produce a unit of output in Lithuania twice exceeds the average of the European Union countries.

This paper investigates the energy intensity from a production theoretic framework and uses annual data of 1998-2011 to measure energy intensity in the Lithuanian manufacturing sector. The investigation compares energy intensity in manufacturing across different activities, based on several models. The results of the research show considerable variation in energy intensity across the activities. Based on energy intensity ratio, the Lithuanian manufacturing activities are classified into three categories, such as high energy-intensive, moderate energy-intensive and low energy-intensive. The research reveals a strong and negative interrelationship between intensity of energy consumption and manufacturing production. Over a period of 1998-2011, the contribution of high energy-intensive industries to total manufacturing value added was increasing and amounted to 30 percent at the end of 2011. Finally, the research provides insights, that restructuring of the activities from energy intensive industries towards more technologically advanced ones might potentially lead to higher energy efficiency and it could be one of the most important routes to sustainable development.

Keywords: energy intensity, energy efficiency, manufacturing sector, industry

Reference to this paper should be made as follows: Dudzevičiūtė, G. 2013. Energy intensity in the Lithuanian manufacturing sector, Journal of Security and Sustainability Issues 3 (2): 77–85.

JEL classifications: L16, L6, Q40.

1. Introduction

Energy, as a product of economic activities, comprises goods and services related to heat, fuel, and power. “As any other commodity, energy is the result of production, such as extraction from mineral resources or transformation of materials and substances into a new product, which can be exchanged on the market or serve as input for production of other goods and services or be used for final consumption” (Upadhyaya 2010, 2 p.). In the economic studies (Mukherjee 2008, Industrial Development report 2011), energy intensity ratio of the manufacturing process is described as the amount of energy used to produce one unit of economic activity, for example, tonnes of oil equivalent per $1000 in manufacturing value added (in constant prices). It is the inverse of energy efficiency, i.e. declining energy intensity over time is interpreted as improving energy efficiency.

* Research was prepared within framework of long-term Economic Research Program, topic Energytically secure and sustainable restructuring of Lithuanian industry sectors in the context of world economy development tendencies’ confirmed by Research Council of Lithuania, IEP-01/2012.
At industry sector level, energy intensity in the European Union recorded a decrease of more than 10 % between 2000 and 2011 (Eurostat database). The most significant decreases (over 30 %) were registered in Slovakia, Lithuania, Bulgaria and Romania. In spite of this decrease, the energy intensity in all four countries remained high. In Lithuania, the energy required to produce a unit of output twice exceeds the average of the European Union and it is three times above average of the countries with the lowest energy intensity (Denmark, Ireland and United Kingdom) (Eurostat database). In the case of Lithuania, high energy intensity might impact on international competitiveness of the country and pose constraints for sustainable development. Growing demand for energy raise doubts whether a secure energy supply will be satisfied in the future and whether Lithuania will be able to remain competitive in the international markets (Travkina & Tvaronavičienė 2011; Smaliukienė et al. 2012; Dudzevičiūtė 2012, Lankauskienė & Tvaronavičienė 2012; Dudzevičiūtė 2013; Vosylius et al. 2013).

Manufacturing accounts above 25 % of total energy consumption in the world and energy has been the major concern for sustainable development, environmental protection and a decent standard of living (Upadhyaya 2010). According to UNIDO Report 2011, increased industrial energy efficiency is one of the most important routes to sustainable development, particularly in developing countries. Industry remains among the most energy-intensive sectors. It contributes to global GDP less than to global share of energy consumption.

Lithuanian manufacturing contribution to total value added increased from 17 % in 1990 to 21 % in 2011 (UN Statistics data) and have remained relatively significant in comparison with advanced economies of the Scandinavian countries with average contribution of 13 % in 2011. During the same period of time the Lithuanian energy consumption in manufacturing decreased about 70 %, but energy intensity ratio remained above average in comparison with many the European countries. On average over a period of 1990-2011, low-income developing economies had the highest energy intensity and developed economies had the lowest one (UN Statistics data). Industrial energy intensity declines due to contribution of structural changes and as a result of technological changes. In high income economies, the structural effect is more visible than the technological one (Industrial Development Report 2011).

This research attempts to provide more reliable estimates of the Lithuanian manufacturing energy intensity from a production theoretic framework and uses annual data of 1998-2011.

The paper is organized as follows. Section 2 gives a short summary of the relevant empirical literature on energy intensity issues and research methodology. The investigations of different researchers are summarized and the main insights are provided. Section 3 analyses the Lithuanian energy intensity across different industrial activities and classifies them by energy intensity level. Section 4 concludes summarizing the main trends observed.

2. Empirical studies’ review and research methodology

An overview of empirical studies has showed that the assessment of energy intensity and its trends is a research topic that continuously attracts researchers from different countries. The interest of energy consumption and economic growth grew in the seventies, and the relevance of this topic is taking on even greater meaning nowadays due to the scarcity of energetic resources and growing their prices. All economic sectors and activities depend on energetic resources and strongly affected by them (Munim et al. 2010, Smaliukienė et al. 2012, Tang & Tan 2012; Dudzevičiūtė 2013).

Many researchers agree that the interaction between energy intensity and economic growth depends on the country’s level of development, economic state, technology that is used (Akinlo 2009, Li 2010, Amador 2011, Zheng et al. 2011, Bojnec & Papler 2011, Sadorsky 2012). Some studies Grebliauskas & Ramanauskas 2007; Zheng et al. 2011, Amador 2011, Sadorsky 2012) reveal that in medium and high-tech countries economic growth and energy intensity interact closely, while in low-tech countries this relationship is not significant. Energy intensive sectors, such as chemical and petrochemical, steel and iron accounted for even about 70 % of the European Union’s total industrial energy consumption.

Three approaches are mainly prevailing in the scientific literature regarding energy consumption or intensity and economic growth issue. These approaches are as follows: 1) growth (Ho et al. 2007; Chontan-
The growth approach describes that energy consumption is an essential component in economic growth. The presence of unidirectional causality from energy consumption to economic growth means that the economy is energy dependent (Apergis & Danuletiu 2012; Dudzevičiūtė 2013).

Feedback approach supports bidirectional causality between energy consumption and economic growth, while neutral approach shows the absence of causality. Neutral causality means that energy conservation policy will not have a significant impact on economic growth (Apergis & Danuletiu 2012; Dudzevičiūtė 2013).

The researchers have concluded that there are interdependency of energy consumption or intensity and economic growth, but the practices of different countries lead to different results regarding the presence of causality.

In the Lithuanian context, however, there is the shortage of detailed research on energy intensity in manufacturing sector. Notable studies of the Lithuanian scientists include more general investigations at macroeconomics level. Bobinaitė et al. (2011) assessed the causality relationship between renewable energy consumption and economic growth in Lithuania; Smaliukienė et al. (2012) investigated inter-relationship between energy consumption and the Lithuanian economic growth; Konstantinavičiūtė et al. (2010) examined the dynamic of energy demand; Dudzevičiūtė (2013) did research on economic structural changes and energy consumption.

The research was guided by the measurement of energy intensity from a production theoretic framework applied in Mukherjee’s (2008) and s Upadhyaya’s (2010) surveys and uses data involving energy consumption and output by the Lithuanian manufacturing sub-sectors. The comparative statistical analysis of the energy intensity of different industrial activities was applied in order to derive observed activities into high energy intensive, moderate energy intensive and low energy intensive ones. The author refer to Upadhyaya’s (2010) and UNIDO’s methodology on energy intensity considered in Industrial Development Report 2011 (UNIDO 2011).

**Energy intensity indicator** is based on the relation of energy input and output. It is one of the major indicators of energy efficiency, which is calculated as follows:

\[ E_{\text{int}} = \frac{E}{Y} \]  
\[ E_{\text{int}} = \frac{E}{Y} = \sum E_{\text{int}_{i, t}} S_{i, t} \]  
\[ S_{i, t} = \frac{Y_{i, t}}{Y_t} \]  

where: \( E_{\text{int}} \) - energy intensity ratio; \( E \) - total consumption of energy by manufacturing sector for \( t \) year; \( Y_t \) - output of manufacturing or manufacturing value added (MVA) for \( t \) year.

Energy intensity decreases in two cases: 1) when less energy is used to produce the same amount of production or 2) when production increases per unit of energy used.

Having manufacturing sub-sectors data, the energy intensity described in formula (1) can be decomposed in order to measure energy intensity at sectoral level and structural change on overall energy intensity. The formula (1) is expanded as follows:

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Having manufacturing sub-sectors data, the energy intensity described in formula (1) can be decomposed in order to measure energy intensity at sectoral level and structural change on overall energy intensity. The formula (1) is expanded as follows:

\[ E_{\text{int}} = \frac{E}{Y} = \sum E_{\text{int}_{i, t}} S_{i, t} \]  
\[ S_{i, t} = \frac{Y_{i, t}}{Y_t} \]  

where: \( E_{\text{int}} \) - energy intensity for total manufacturing for year \( t \); \( E_{\text{int}_{i, t}} \) - energy intensity for \( i \) manufacturing subsector for year \( t \); \( S_{i, t} \) - share of \( i \) sub-sector in total MVA.

Further, manufacturing sub-sectors were arranged by rank score in order to identify highest to lowest energy intensive manufacturing activities. Obtained results were compared to the mean energy intensity ratio calculated as follows:

\[ E = \frac{\sum E_{\text{int}}}{n} \]  

where: \( E \) -mean energy intensity ratio; \( E_{\text{int}} \) - energy intensity for total manufacturing for year \( t \); \( n \) - number of observations.

In the scientific works (Sheehan, Sun 2007; Yao, Luo 2012; Bobinaité et al.2011; Steinbuks 2012) energy use elasticity is analyzed with different respects. Referring to the proposed methodology of these authors, energy elasticity with respect of manufacturing
production is calculated as follows:

$$E = \frac{\Delta Q_E \%}{\Delta P_M \%}$$  \hspace{1cm} (5)

where: E - energy elasticity with respect of manufacturing production; \( \Delta Q_E \% \) - percentage change in energy consumption; \( \Delta P_M \% \) - percentage change in manufacturing production.

These above described indicators are easy to calculate, they are informative for interpretation of their impact on economic development. However, they give only general information and do not reveal the reasons for energy efficiency.

3. The Lithuanian manufacturing dependence on energy consumption

3.1. Manufacturing sector’s trends and energy intensity

Two approaches are employed in this research. First, annual data analysis of the Lithuanian manufacturing sector is carried out in the period of 1998-2011. The aim of this exercise is to analyze the relationship among manufacturing sector’s trends, energy consumption and energy intensity. Second, the energy intensity at the sub-sectors level is decomposed into activities and three categories based on energy consumption intensity are distinguished as follows: 1) high energy intensity, 2) moderate energy intensity and low energy intensity. The twelve subsectors are defined for each analysis, i.e. 1) food, beverages, and tobacco; 2) textile and leather; 3) wood and wood products; 4) paper and print; 5) chemical and chemical products; 6) rubber and plastics; 7) non-metallic mineral products; 8) basic metal; 9) fabricated metal products; 10) machinery and equipment; 11) transport and equipment; 12) furniture and other.

Figure 1 reveals the relationships among the Lithuanian manufacturing production development, energy consumption and energy intensity as well. Over a period of 1998-2011, the Lithuanian manufacturing production has increased twice from LTL 17.7 million to LTL 34.5 million while energy consumption has decreased by 5 % from 39505 TJ to 37715 TJ. These changes have impacted on energy intensity ratio, which has dropped from 2.3 to 1.1 J per LTL 1000.

![Fig. 1. The Lithuanian manufacturing production and energy trends in 1998-2011](image)

**Source:** author’s calculations based on the Lithuanian Statistics department data

The analysis has shown moderate and positive interrelationship with correlation coefficient of 0.6 between manufacturing production and energy consumption and a very strong and negative relationship (correlation is 0.9) between manufacturing production and energy intensity (Fig. 1). As manufacturing production is increasing, energy intensity is decreasing over the same period of time. The significance of the correlation coefficient is proved by the help of Student’s criteria t. In this case \( t = \frac{r_{st}}{s_{st}} \) (7,16>2,18), it means that significant relationship is confirmed.

The examination of the long-run (1998-2011) energy use percentage change and manufacturing production change has described that the Lithuanian industry is inelastic of energy consumption. Over 2000-2011, the average elasticity coefficient has made 0.6. It means that the Lithuanian manufacturing was improving its energy efficiency over time. Table 1 describes percentage change in manufacturing production and energy consumption. In general,
energy consumption grew at a much lower rate than manufacturing production, excluding 1999 and 2008.

**Table 1.** The changes in manufacturing production and energy consumption

<table>
<thead>
<tr>
<th>Year</th>
<th>Manufacturing production</th>
<th>Energy consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>-1.3</td>
<td>-17.5</td>
</tr>
<tr>
<td>2000</td>
<td>7.2</td>
<td>-4.8</td>
</tr>
<tr>
<td>2001</td>
<td>-3.4</td>
<td>-0.6</td>
</tr>
<tr>
<td>2002</td>
<td>14.3</td>
<td>11.4</td>
</tr>
<tr>
<td>2003</td>
<td>12.5</td>
<td>5.4</td>
</tr>
<tr>
<td>2004</td>
<td>7.6</td>
<td>2.9</td>
</tr>
<tr>
<td>2005</td>
<td>11.3</td>
<td>5.9</td>
</tr>
<tr>
<td>2006</td>
<td>15.3</td>
<td>6.4</td>
</tr>
<tr>
<td>2007</td>
<td>14.3</td>
<td>0.7</td>
</tr>
<tr>
<td>2008</td>
<td>-7.9</td>
<td>-11.2</td>
</tr>
<tr>
<td>2009</td>
<td>-17.0</td>
<td>-12.6</td>
</tr>
<tr>
<td>2010</td>
<td>9.4</td>
<td>9.5</td>
</tr>
<tr>
<td>2011</td>
<td>12.4</td>
<td>5.0</td>
</tr>
</tbody>
</table>

*Source: author’s calculations based on the Lithuanian Statistics department data*

The analysis of separate years has revealed that in 1999 and 2008 the energy use in the Lithuanian manufacturing was elastic of production (Fig. 2).

![Fig. 2. Energy elasticity with respect of production in the Lithuanian manufacturing sector](image)

The elasticity of energy use with respect of production varied from 13.2 in 1999 to 1.4 in 2008. Many factors impacted on it, but the most influential ones could be named as economical crisis in Russia in the middle of 1998 and financial and economical crisis all over the world in 2008. It showed the Lithuanian manufacturing sensitivity and dependence on trading partners and situation in the world economy.

Detailed analysis is needed at manufacturing sector level to identify the most energy-intensive activities as well as the lowest ones. Next part of the investigation is devoted for this issue.
3.2. Analysis of energy intensity at manufacturing sector's level

Average manufacturing energy intensity fell in all activities over 1998-2011. Non-metallic minerals and basic metals sub-sectors reported the most significant improvement of energy efficiency from 1998 to 2011 (Table 2). Energy intensity ratio was reduced by 6.1 and 4.0 J/LTL1000 respectively.

Table 2. Energy intensity (J/LTL1000) of manufacturing activities

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and tobacco</td>
<td>1.24</td>
<td>1.18</td>
<td>1.07</td>
<td>0.99</td>
<td>1.07</td>
<td>0.98</td>
<td>0.90</td>
<td>0.85</td>
<td>0.78</td>
<td>0.74</td>
<td>0.69</td>
<td>0.70</td>
<td>0.76</td>
<td>0.75</td>
</tr>
<tr>
<td>Textiles and leather</td>
<td>1.48</td>
<td>1.24</td>
<td>1.01</td>
<td>1.01</td>
<td>1.00</td>
<td>1.08</td>
<td>1.02</td>
<td>0.99</td>
<td>0.93</td>
<td>0.78</td>
<td>0.57</td>
<td>0.78</td>
<td>0.64</td>
<td>0.49</td>
</tr>
<tr>
<td>Wood and wood products</td>
<td>3.21</td>
<td>1.72</td>
<td>1.28</td>
<td>2.02</td>
<td>2.43</td>
<td>2.30</td>
<td>2.39</td>
<td>2.15</td>
<td>1.98</td>
<td>1.99</td>
<td>2.08</td>
<td>1.79</td>
<td>1.88</td>
<td>1.46</td>
</tr>
<tr>
<td>Paper and print</td>
<td>2.87</td>
<td>2.53</td>
<td>3.10</td>
<td>3.15</td>
<td>1.89</td>
<td>1.63</td>
<td>1.13</td>
<td>1.26</td>
<td>1.03</td>
<td>0.97</td>
<td>1.63</td>
<td>2.01</td>
<td>1.35</td>
<td></td>
</tr>
<tr>
<td>Chemical and chemical products</td>
<td>4.36</td>
<td>3.11</td>
<td>2.84</td>
<td>2.91</td>
<td>2.66</td>
<td>2.86</td>
<td>3.15</td>
<td>3.03</td>
<td>2.83</td>
<td>1.98</td>
<td>2.36</td>
<td>2.56</td>
<td>2.39</td>
<td>2.45</td>
</tr>
<tr>
<td>Rubber and plastics</td>
<td>1.11</td>
<td>0.92</td>
<td>0.57</td>
<td>0.60</td>
<td>0.51</td>
<td>0.32</td>
<td>0.44</td>
<td>0.45</td>
<td>0.39</td>
<td>0.44</td>
<td>0.46</td>
<td>0.58</td>
<td>0.45</td>
<td>0.46</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>11.69</td>
<td>10.73</td>
<td>9.90</td>
<td>10.89</td>
<td>9.23</td>
<td>7.20</td>
<td>6.60</td>
<td>5.70</td>
<td>5.12</td>
<td>5.09</td>
<td>5.17</td>
<td>6.10</td>
<td>5.78</td>
<td>5.56</td>
</tr>
<tr>
<td>Basic metals</td>
<td>4.60</td>
<td>2.18</td>
<td>1.38</td>
<td>1.58</td>
<td>1.07</td>
<td>1.42</td>
<td>2.34</td>
<td>2.10</td>
<td>2.14</td>
<td>1.82</td>
<td>0.68</td>
<td>0.58</td>
<td>0.70</td>
<td>0.61</td>
</tr>
<tr>
<td>Fabricated metal products</td>
<td>1.70</td>
<td>2.86</td>
<td>0.71</td>
<td>0.93</td>
<td>0.91</td>
<td>0.57</td>
<td>0.62</td>
<td>0.52</td>
<td>0.41</td>
<td>0.22</td>
<td>0.29</td>
<td>0.35</td>
<td>0.39</td>
<td>0.33</td>
</tr>
<tr>
<td>Machinery and equipment (instruments)</td>
<td>1.66</td>
<td>1.32</td>
<td>2.07</td>
<td>1.89</td>
<td>1.67</td>
<td>1.42</td>
<td>1.37</td>
<td>1.15</td>
<td>0.60</td>
<td>0.37</td>
<td>0.34</td>
<td>0.27</td>
<td>0.27</td>
<td>0.24</td>
</tr>
<tr>
<td>Transport and equipment</td>
<td>1.55</td>
<td>0.93</td>
<td>0.75</td>
<td>1.04</td>
<td>1.02</td>
<td>0.61</td>
<td>0.44</td>
<td>0.43</td>
<td>0.41</td>
<td>0.34</td>
<td>0.26</td>
<td>0.45</td>
<td>0.34</td>
<td>0.21</td>
</tr>
<tr>
<td>Furniture and other</td>
<td>0.80</td>
<td>0.63</td>
<td>0.67</td>
<td>0.95</td>
<td>0.86</td>
<td>0.97</td>
<td>0.79</td>
<td>0.70</td>
<td>0.56</td>
<td>0.44</td>
<td>0.32</td>
<td>0.29</td>
<td>0.29</td>
<td>0.33</td>
</tr>
<tr>
<td>Total</td>
<td>2.26</td>
<td>1.89</td>
<td>1.68</td>
<td>1.73</td>
<td>1.68</td>
<td>1.58</td>
<td>1.51</td>
<td>1.43</td>
<td>1.32</td>
<td>1.17</td>
<td>1.12</td>
<td>1.18</td>
<td>1.17</td>
<td>1.11</td>
</tr>
</tbody>
</table>

Source: author's calculations based on the Lithuanian Statistics department data

Manufacturing sub-sectors were arranged by rank score in order to identify highest to lowest energy intensive activities. Obtained results from every sub-sector were compared to the mean energy intensity ratio of total manufacturing sector. After comparison of the results, manufacturing activities were grouped into three categories of energy intensity (Table 3).

As analysis shows, that five manufacturing sub-sectors (wood and wood products, paper and print, chemical and chemical products, non-metallic minerals and basic metals) belong to high energy-intensive group, three industries (food and tobacco, textiles and leather, machinery and equipments) belong to moderate energy intensive group and four industries to low energy-intensive group.

Table 3. Manufacturing classification based on energy intensity

<table>
<thead>
<tr>
<th>Energy intensity</th>
<th>Manufacturing activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>High energy-intensive</td>
<td>Wood and wood products</td>
</tr>
<tr>
<td></td>
<td>Paper and print</td>
</tr>
<tr>
<td></td>
<td>Chemical and chemical products</td>
</tr>
<tr>
<td></td>
<td>Non-metallic minerals</td>
</tr>
<tr>
<td></td>
<td>Basic metals</td>
</tr>
<tr>
<td>Moderate energy-intensive</td>
<td>Food and tobacco</td>
</tr>
<tr>
<td></td>
<td>Textiles and leather</td>
</tr>
<tr>
<td></td>
<td>Machinery and equipment (instruments)</td>
</tr>
<tr>
<td>Low energy-intensive</td>
<td>Rubber and plastics</td>
</tr>
<tr>
<td></td>
<td>Fabricated metal products</td>
</tr>
<tr>
<td></td>
<td>Transport and equipment</td>
</tr>
<tr>
<td></td>
<td>Furniture and others</td>
</tr>
</tbody>
</table>

Source: author's calculations
Over 1998-2011, total contribution of high energy-intensive industries to total manufacturing value added increased from 23.8 percent to 30.8 percent, low group's increased from 15.2 to 24.6 percent while moderate energy-intensive group reported decrease from 61.0 to 44.6 percent (Fig. 3).

The intensity of energy consumption varied from 5.3 in 1998 to 2.4 J/LTL 1000 in high energy-intensive group, from 1.3 to 0.6 in moderate energy-intensive group and from 1.2 to 0.3 in low energy-intensive group.

As historical data confirmed, energy-intensive activities share in total manufacturing production was increasing over 1998-2011. Referring to this fact as well as evidence that energy-intensive branches amounted to 30 percent of total manufacturing value added, the danger for the Lithuanian competitiveness exits. The restructuring of the activities from energy intensive industries towards more technologically advanced could lead to sustain the Lithuanian manufacturing development and competition in the global context.

4. Conclusions

The research is based on the production theoretic framework and measures energy intensity in the Lithuanian manufacturing sector. The results of the research show variation in energy intensity across the manufacturing activities. The Lithuanian manufacturing activities are classified into three categories, such as high energy-intensive, moderate energy-intensive and low energy-intensive. According to energy intensity ratio, five industries belong to high energy-intensive group, three industries-to moderate energy-intensive group and four manufacturing activities-to low energy intensive group.

Over a period of 1998-2011, the contribution of high energy-intensive industries to total manufacturing value added was increasing and these activities accounted to 30 percent of total manufacturing value added. The risk for the further manufacturing development efficiency exists and high energy-intensive industries should be under special consideration in order to avoid losses in the global context.

The examination of the long-run (1998-2011) energy use percentage change and change in manufacturing production has described that the Lithuanian industry is inelastic of energy consumption. Energy consumption has grown at a much lower rate than manufacturing production, excluding 1999 and 2008. In general, it means that the Lithuanian manufacturing has improved its energy efficiency since 1999.

Lithuania's manufacturing sector with respect to energy situation involves a need to lower energy consumption and increase energy efficiency, particularly of wood and wood products, paper and print, chemical and chemical product, non-metallic minerals and basic metals.
References


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Dear readers,

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The name and surname of the authors should be printed in small letters of 11 pt bold type and should be centred. Below the author’s surname, the name of the institution (represented by the author or co-authors) must be printed in 10 pt italic; its address and the author’s e-mail written and centred.

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