

SPIN Country Report Lithuania





Sustainable Production
through Innovation in SMEs

Country report for Lithuania

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Introduction

This report has been compiled for the project “Sustainable Production through Innovation in Small and Medium Sized Enterprises” (EU Project No. 005 SPIN) within the Baltic Sea Region Programme 2007-2013. The report is a part of the WP4.

The report provides an overview of SME sector in Lithuania, information about the framework situation and analysis of SME needs to develop/ implement innovation for sustainable production.

The report has been written by the Institute of Environmental Engineering, Kaunas University of Technology, Lithuania.

1 Overview of SMEs sector

1.1 Definition of SME in Lithuania

Small and medium-sized enterprises (SMEs) are defined as non-subsiary, independent firms that employ no more than a given number of employees. In Lithuania, the upper limit is 250 employees, as defined by the European Commission. Small firms are those with fewer than 50 employees, while micro-enterprises have at most ten, or in some cases five, workers. Financial assets are also used to define SMEs. Definition of SMEs in Lithuania is specified in the Law on Development of SME sector, (the last version of the law came into force on 1st January, 2008) (Table1). The application of this definition is legally binding when support from the public funds to SMEs is concerned.

Table 1. Definition of SME in Lithuania¹

	Number of employees	Annual income
Medium enterprise	Less than 250	Annual income is up to 138 million LTL (40 million EUR) or property balance value is less than 93 million LTL (27 million EUR)
Small enterprise	Less than 50	Annual income is up to 24 million LTL (7 million EUR) or property balance value is less than 17 million. LTL (4,9 million EUR)
Micro-enterprise	Less than 10	Annual income is up to 7 million LTL (2 million. EUR) or property balance value is less than 5 million. LTL (1,45 million. EUR)

1.2 Number and legal status of SMEs

SMEs play a major role in economic growth, and provide most new jobs. According to OECD's Small and Medium Enterprise Outlook, over 95 % of enterprises in OECD countries are SMEs, which account for 60-70 % of employment in most of these countries². In Lithuania SMEs represent 99 % of the total number of enterprises and account for 74% of employment.

Number of SMEs in Lithuania in the last decade was rapidly growing (Fig. 1). There were 18.7 SMEs/ 1000 citizens in January 2008 in comparison to 16,2 SMEs/ 1000 citizens in January 2005.

¹ Government of the Republic of Lithuania (2008). Law on Development of SME sector, Vilnius.

² OECD, (2000). The OECD Small and Medium Enterprise Outlook 2000, OECD, Paris.

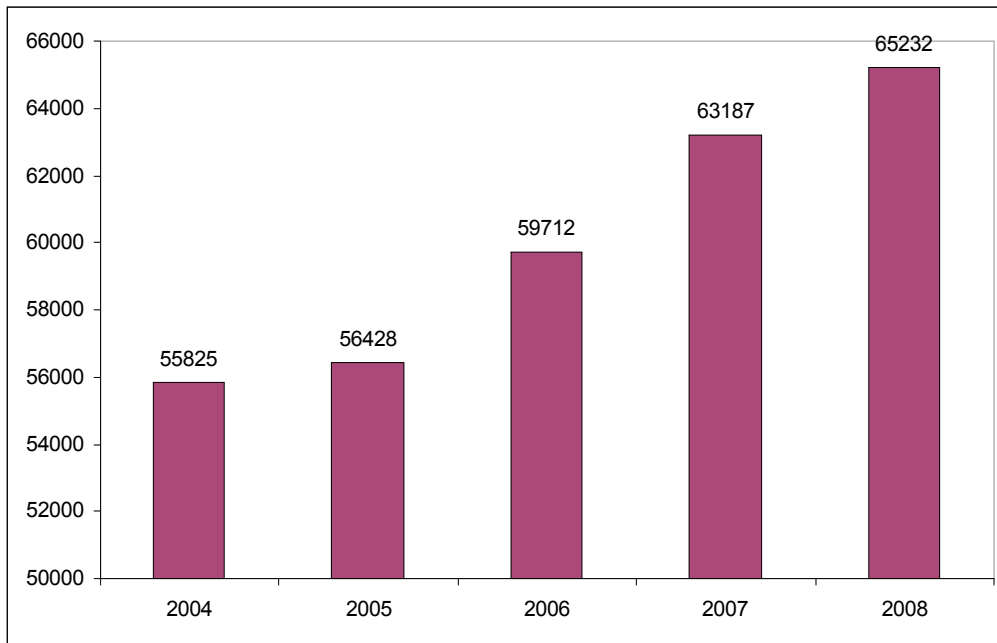


Fig. 1. Number of SMEs in Lithuania (Source: Lithuanian Statistics Department)

In Lithuania, on 1st January 2009, 65232 SMEs have been operating in Lithuania. Micro-enterprises with number of employees not exceeding 10 constituted 74,6 % of the total number of SMEs (Fig. 2). In terms of legal status, SMEs are divided into personal companies, joint stock companies and other companies (e.g. agricultural companies, co-operative enterprises). The biggest share of SMEs has legal status of joint stock companies – 67 % (Fig. 3).

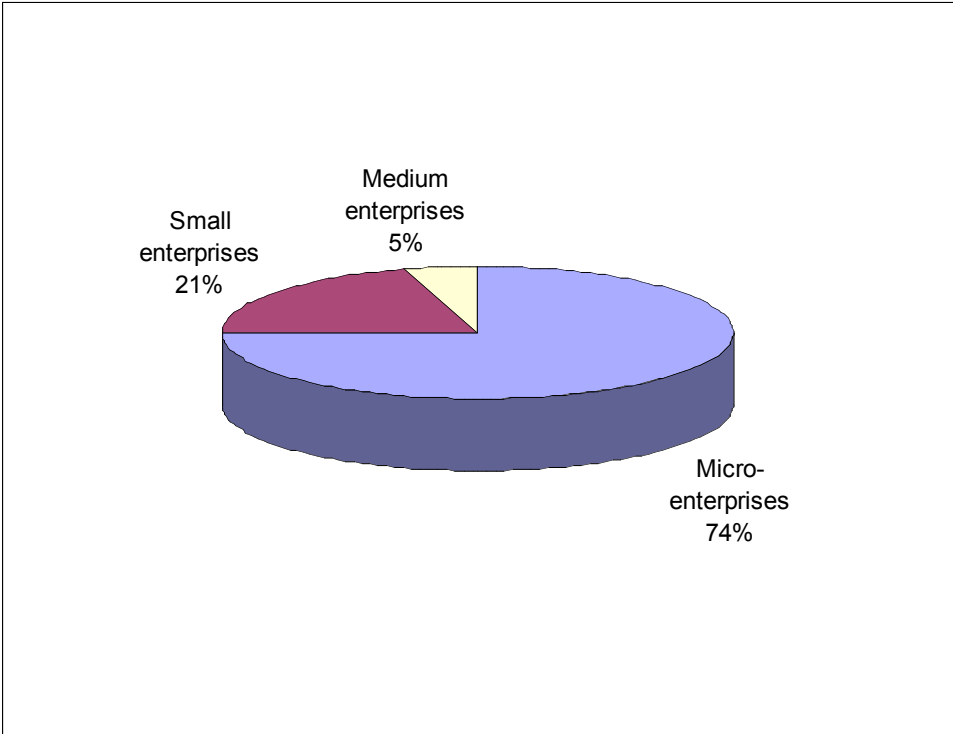


Fig. 2. SMEs sector in Lithuania (January 2009) (Source: Lithuanian Statistics Department)

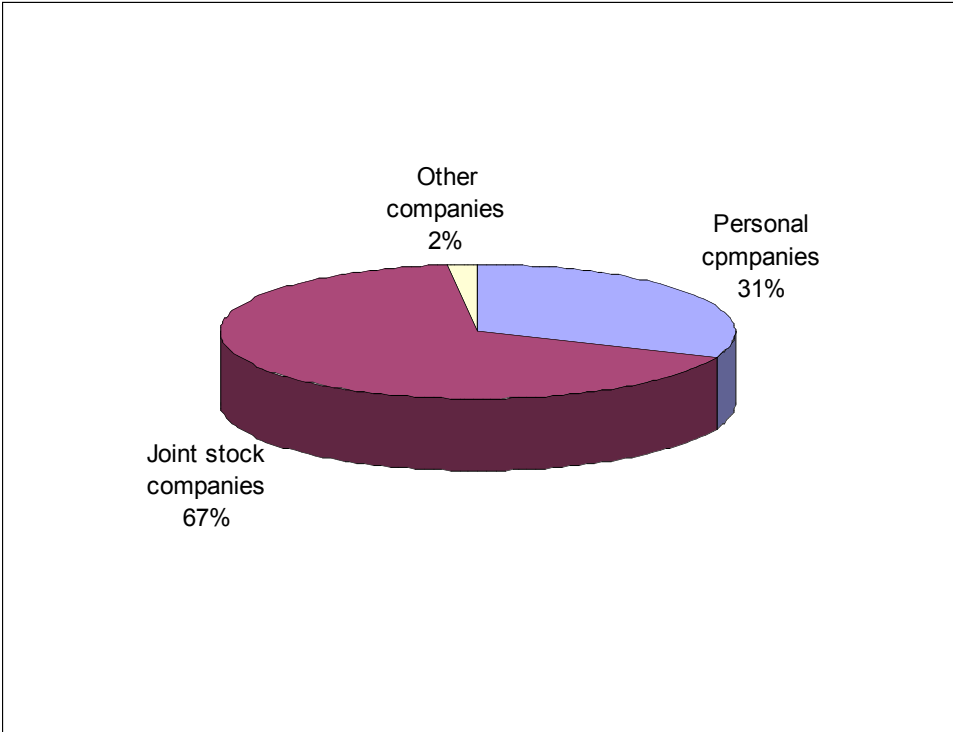


Fig. 3. Legal status of SMEs in Lithuania (January 2009) (Source: Lithuanian Statistics Department)

1.3. Role of SMEs in the national economy

According to statistical data, 74 % from the total number of employees are employed in SMEs (January 2009). Distribution of employees in terms of SME legal form and size is presented in the Fig. 4.

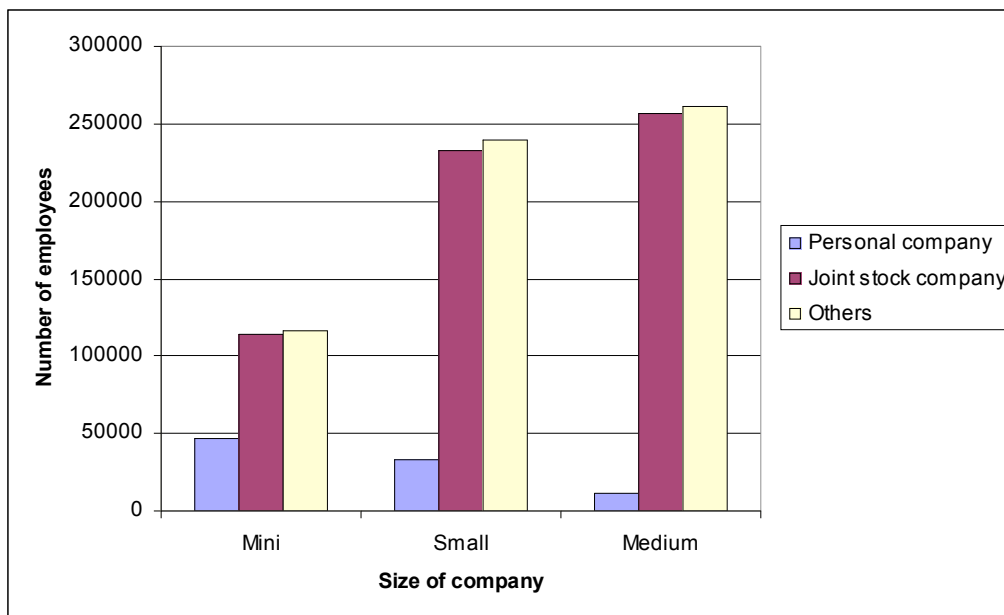
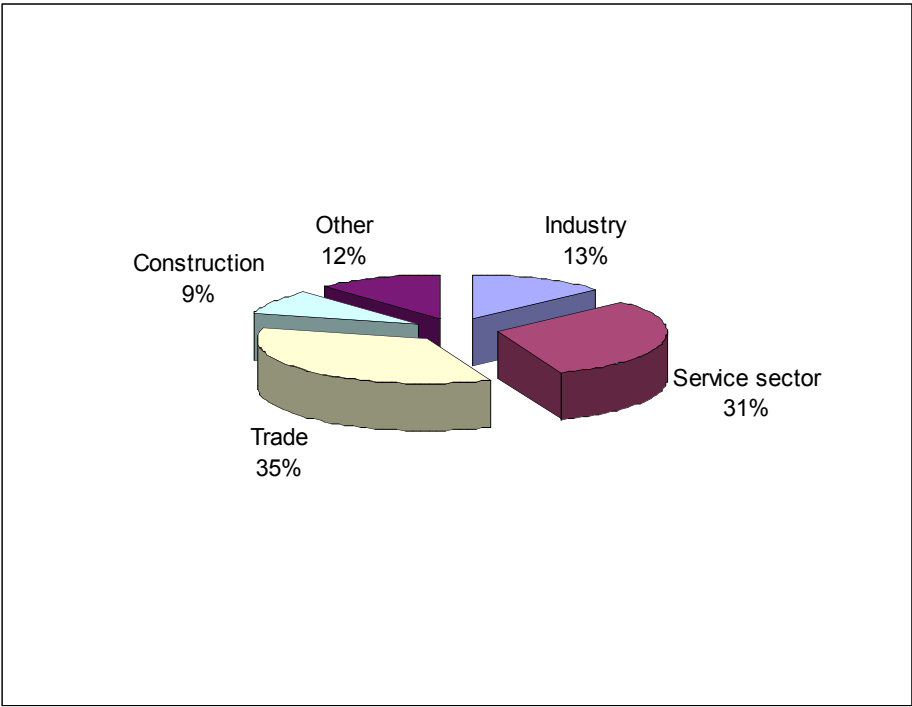


Fig. 4. Distribution of employees in Lithuanian SMEs (January 2009) (Source: Lithuanian Statistics Department)

In terms of economic activities, SMEs active in industrial production constitute 13 % from the total SME number, while service sector and trade companies constitute 31 % and 35 % respectively (Fig. 5).



*Fig. 5. SME distribution in terms of economic activities (January 2009)
(Source: Lithuanian Statistics Department)*

According to the data from Lithuanian Statistics Department, most of SMEs operate in the wood sector. Composition of industrial SME sector is presented in the Fig. 6.

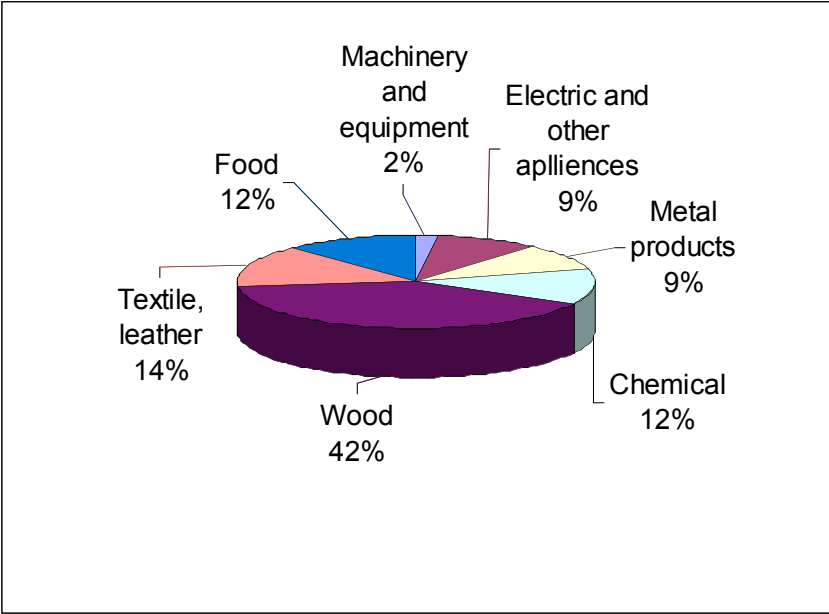


Fig. 6. Composition of industrial SME sector in Lithuania (2006) (Source: Lithuanian Statistics Department)

Data concerning number of enterprises in terms of the type of economic activities and size for selected sectors, mainly focusing on industrial activities is presented in the table 2.

Table. 2. Distribution of enterprises according to the type of economic activities and size (selected sectors, January 2009) (Source: Lithuanian Statistics Department)

	Economic activity	Number of employees				Total
		<9	10 - 49	50 - 249	>250	
1	Agriculture	374	263	111	6	754
2	Forestry	528	141	49	1	719
3	Fishery	108	29	1	1	139
4	Production of food products	323	291	138	36	788
5	Textile	85	61	34	13	193
6	Production of wood products (except of furniture)	723	531	113	7	1374
7	Production of chemicals	36	36	14	5	91
8	Production of rubber and plastic products	157	153	47	3	360
9	Production of metal products (except of machinery and equipment)	348	263	63	7	681
10	Furniture production	410	281	86	21	798
11	Construction of buildings	2364	957	276	23	3620
12	Wholesale trade	5690	1518	245	14	7467
13	Retail trade	8515	1542	226	37	10320
14	Transport	3548	1074	216	14	4852
15	Publishing	404	121	21	2	548
16	Telecommunications	232	65	13	3	313
17	Architectural and engineering activities	1653	274	34	1	1962
Total		48679	13580	2973	397	65629

In terms of geographical distribution, the biggest number of SMEs operate in Vilnius region (38 %) followed by Kaunas (20 %) and other regions of biggest cities (Fig. 7). However, in terms of sales of goods and services, most of exporting companies are concentrated in Alytus region (23,5 %) and Klaipeda region (20,1 %).

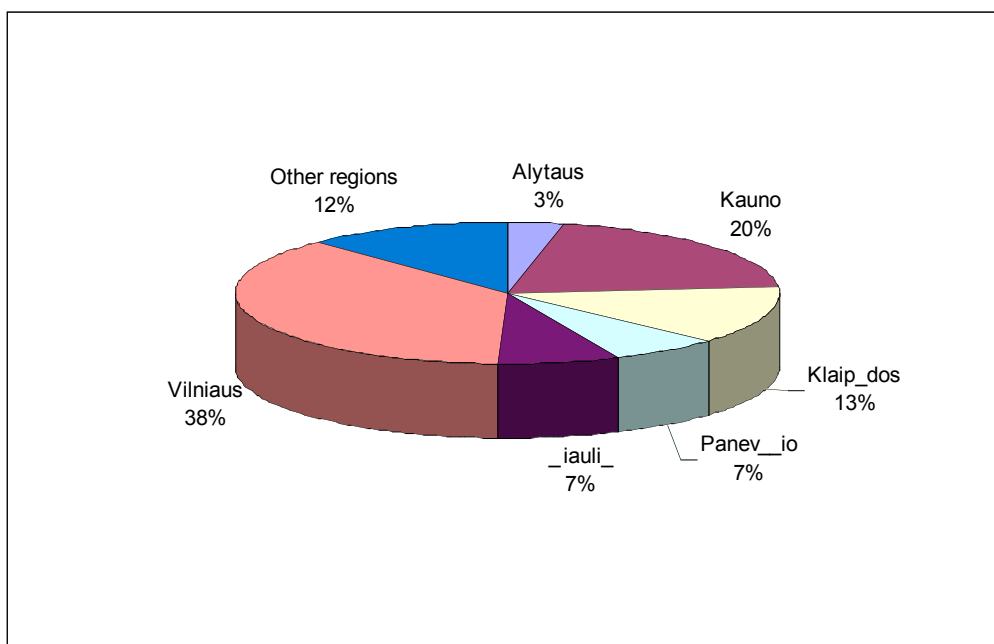


Figure 7. Geographical distribution of SMEs (Source: Lithuanian Statistics Department)

Contribution of SMEs to the Lithuanian economy is determined by a high share of these companies in the overall number of enterprises. According to data from Lithuanian Statistics Department, total value added generated by SMEs (without financial intermediaries and agricultural companies) in 2004 – 2006 increased by 8,5 billion LTL (2,46 billion EUR) or 59 % - from 14,4 billion LTL in 2004 to 22,9 billion LTL in 2006. Percentage of total value added created by SMEs in the total value added created by all Lithuanian enterprises was also increasing (from 57,6 % in 2004 to 64,1 % in 2006). These figures demonstrate increasing role of SMEs sector in the Lithuanian economy.

Distribution of total value added created by different SMEs is presented in the Fig. 8. The biggest share belongs to trade sector (27,7 %) and service sector (28,1 %).

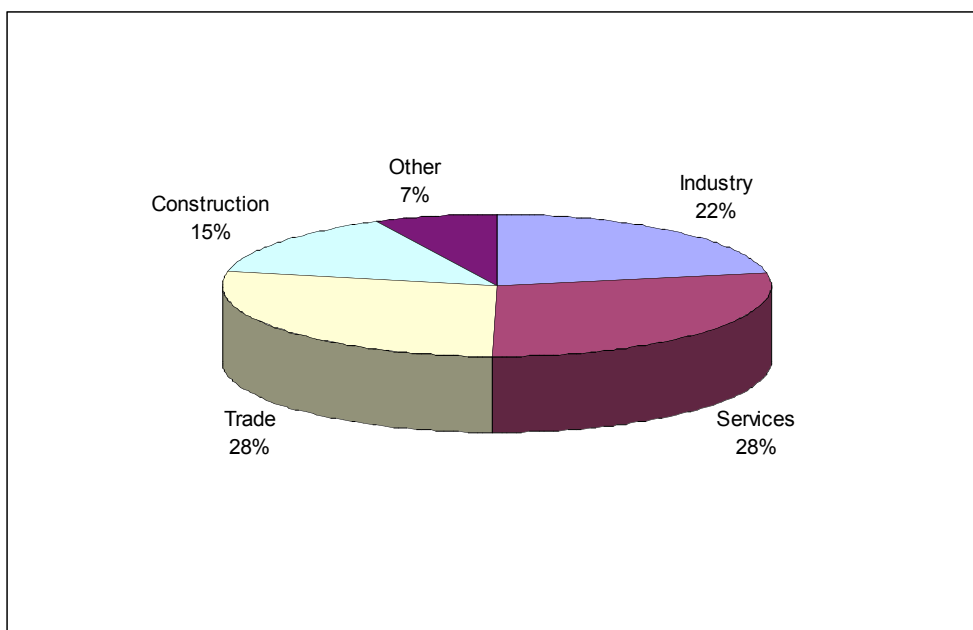


Fig. 8. Total value added created by Lithuanian SMEs in different sectors (Source: Lithuanian Statistics Department)

In 2009, 41,3 % of SMEs sold their products and provided services in the local/ regional market, while 33,3 % of the SMEs have been active in the national market. 16,5 % of SMEs exported their goods and services to the EU countries and 8,9 % SMEs to other countries (Fig. 9).

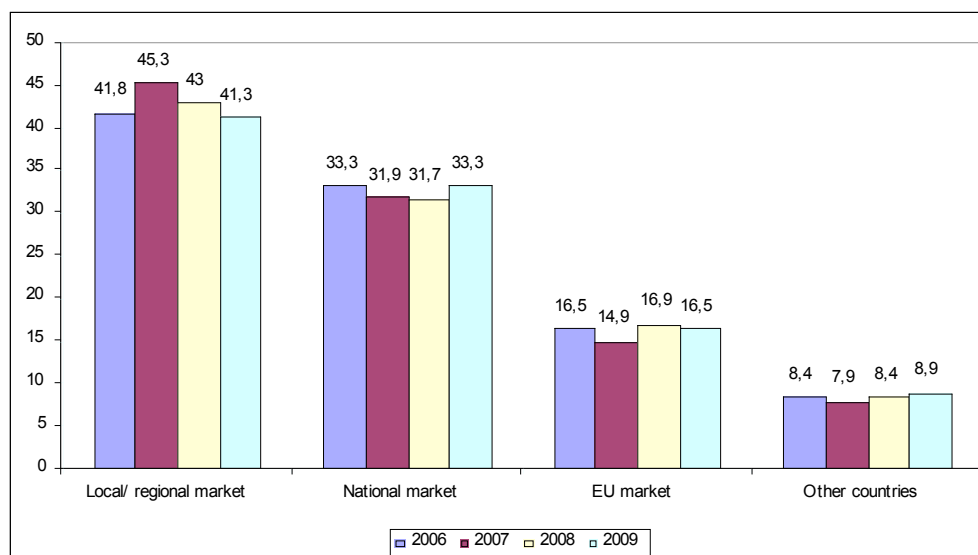


Fig. 9. Sales of goods and services of Lithuanian SMEs, % (Source: Lithuanian Statistics Department)

In 2007, export from SMEs reached 58,2 % from the total export from Lithuania and import reached 67,7 %. The share of SME export in the total international trade from Lithuania was increasing, e.g. in 2006 this increase

was 4,9 %, and 9,2 % in 2007 (Fig. 10). Increase of SMEs' share in the international trade demonstrates increasing international competitiveness. However, import share is bigger than export share and this shows that SME possibilities in export are still smaller that possibilities of big enterprises.

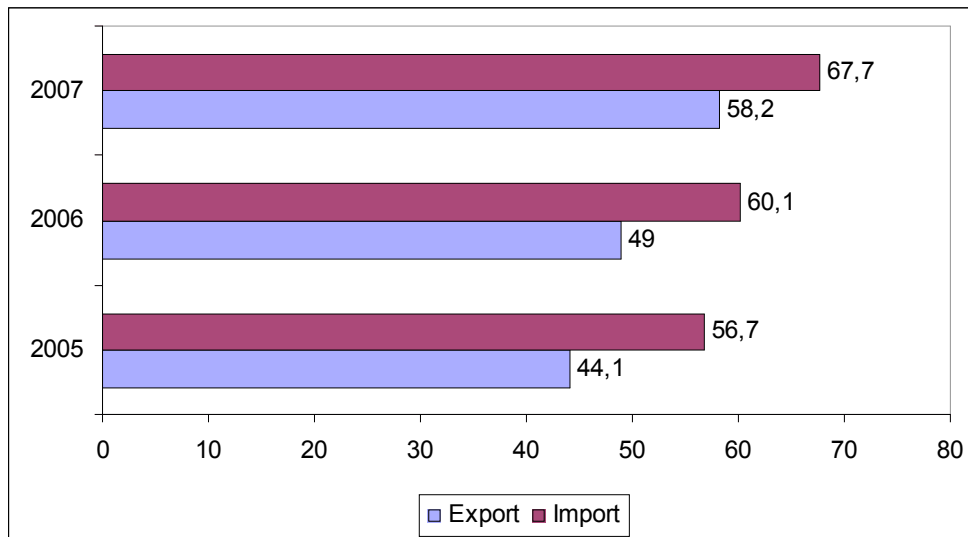


Fig. 10. The share of export and import from SMEs in the total international trade from Lithuania (Source: Lithuanian Statistics Department)

Export and import analysis in different SME sectors shows that the biggest share belongs to trade sector followed by SMEs operating in the industry sector. The share of service, construction and other sectors is very small (Fig. 11). In terms of legal status of SMEs, the role of joint stock companies in export and import is dominating and was 92,7 % of total SMEs export and 91 % of SMEs import in 2007. Approximately 5 % of export and import belongs to individual companies.

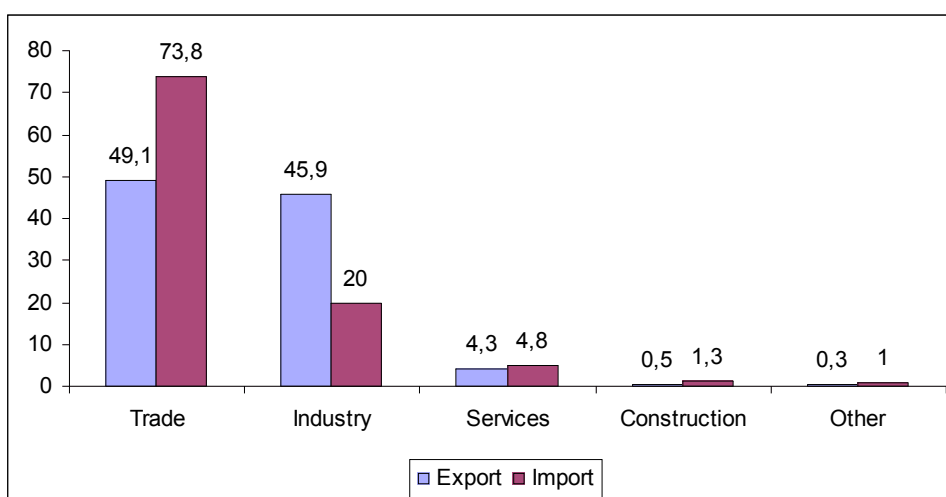


Fig. 11. Volume of export and import in different Lithuanian SME sectors, % (2007) (Source: Lithuanian Statistics Department)

1.4. SMEs and innovations

One of the main features of SMEs sector is continuous change. To survive in the rapidly changing business environment, SMEs have to be flexible, dynamic and open. In this context, innovations have particularly important role. Moreover, research of the Organisation for Economic Co-operation and Development (OECD) show that development of the economically developed countries will largely depend on innovations that reduce costs and increase productivity³.

In Lithuania, approximately 40 % of SMEs are involved in innovation activities (Fig 12).

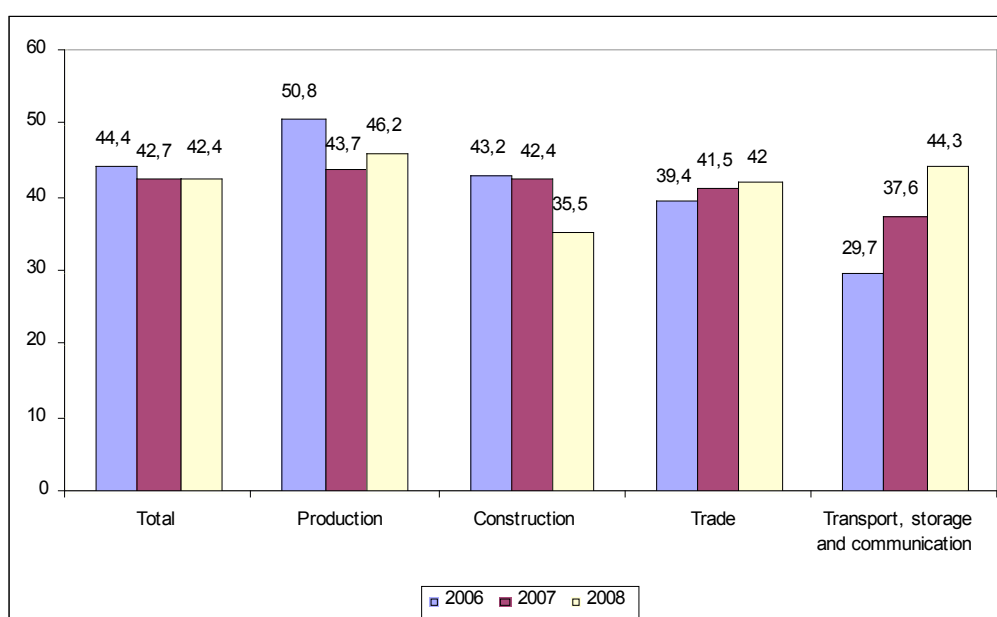


Fig. 12. Percentage of Lithuanian SMEs involved in innovation activities (Source: Lithuanian Statistics Department)

However, the study conducted by the Lithuanian statistics department also revealed that number of enterprises that have implemented innovations in 2009 dropped by 8,4 % in comparison to 2008 (34 % in 2009 and 42,4 % in 2008). Information technologies (computer, internet) was used by 92,9 SMEs (88,6 % in 2008 and 86,3 % in 2007).

In terms of innovation type, product innovations clearly prevail (59,8 % of all innovations in 2008). This type of innovations was most popular in all sectors, except of transport, storage and communication where management and marketing innovations prevailed. New production processes or methods (technological innovations) were implemented in 59,8 % of production companies, and 50 % of construction companies. Organisational innovations were popular among transport, storage and communication companies 54,5

³ OECD (1997). The World in 2020: Towards a New Global Age, Paris.

%). Marketing innovations were applied by 66,2 % of transport, storage and communication companies as well as 60,6 % of trade companies.

Results of the study conducted for the Nordic Council of Ministers revealed that the main drivers for eco-design practices are market demands (33% of all responses), cost reduction (29%) and legal requirements (26%). The other drivers mentioned in the survey were the interest of owners and/or top management (12%)⁴. The results of surveys imply that legislation is not the main driver for eco-design, however the role of legislation as a driving force is often hidden under “market demands”. The study on eco-design also indicated that eco-design practices are not applied to a wide extent even at the most advanced companies in Lithuania. Even though most of the respondents answered that they take into consideration environmental aspects into product design, usually companies focus on a single, specific issue (whether for legislative, market or economic reasons) and do not use life cycle considerations in the product design. Most typically the consideration of environmental aspects associated with products have been realized in the following directions:

- replacement of hazardous substances (both in products and processes), especially in chemical, textiles, wood and wood processing industry and metal processing industry;
- those dealing with the use of packaging (due to the packaging legislation);
- Improvement of quality and economy of the product (reduced raw material consumption, products with higher quality and better features – so called “win-win” solutions both for economy and environment).

The answers indicated following trends by use of eco-design strategies in different industrial branches:

- *metal processing industry* is more interested in reduction of material use and selection of less hazardous materials, and higher product quality and durability;
- *chemical industry* – replacement of hazardous chemicals with less hazardous;
- *wood processing* – surface treatment and processing, avoiding gluing and lacquering;
- *textile industry* – less hazardous chemicals;
- *food industry* – packaging (material selection and amount of material used per product) and optimisation of logistics;
- *machinery and electronic industry* - reduction of material use and selection of less hazardous materials, as well as product use phase (lower energy/material consumption by product and optimization of initial lifetime (modularity, upgradeability). Efforts are made for managing the product’s end of life (recycling, safe disposal etc).

In terms of production process innovation, more than 100 Lithuanian enterprises implemented preventive environmental innovations (cleaner production measures) in co-operation with the Institute of Environmental

⁴ Belmane I., Karaliunaite I., Moora H. Uselyte R., Viss V. *Eco-design in the Baltic States Industry. Feasibility Study*. Nordic Council of Ministers. Copenhagen. TemaNord: 2003.

Engineering, Kaunas University of Technology. More information about these innovations is provided in the chapter 6.5.

1.5. SMEs and impact to the environment

In principle, SMEs can pose serious environmental problems due to their high numbers and their cumulative effect. Statistical information on environmental impacts of SMEs is quite scarce in both OECD and non-OECD countries, with only few studies quantifying these impacts. For example, a report on SMEs and the environment produced for the European Commission by ECOTEC Research and Consulting mentions that SMEs are estimated to generate as much as 60 % of commercial waste and 80 % of pollution incidents⁵.

A study conducted by the Institute of Environmental Engineering, Kaunas University of Technology for the Ministry of Economy in 2007, Lithuania revealed that total volume of hazardous waste generated in SMEs amounts to 35 000 t/ year and 300 000 tons of non-hazardous waste per year⁶.

According to results of a survey conducted by the Institute of Environmental Engineering, Kaunas University of Technology in the beginning of 2010 among manufacturing and service sector SMEs, a minority of SMEs that participated in the survey responded that they have identified specific environmental problems, while almost 50 % of respondents indicated that they know that environmental problems in their enterprises exist.

⁵ Commission of the European Communities (2000). Report on SMEs and the Environment. Produced by Ecotec Research and Consulting.
ec.europa.eu/environment/sme/pdf/smestudy.pdf

⁶ Ministry of Economy of the Republic of Lithuania (2007). Generation of Production Waste in Small and Medium Sized Enterprises that Do Not Need Integrated Pollution Prevention and Control Permits. Report of applied scientific research, Vilnius.

2 Framework situation

2.1 Regulations/ legislation arrangements

Generally, regulations/ legal requirements do not differ for SMEs and big enterprises in Lithuania. For example, in terms of waste management, legal requirements can be divided into three main groups: (i) general waste management requirements; (ii) requirements governing particular waste management methods and equipment; and (iii) requirements governing management of particular waste streams. All these requirements are applicable to all enterprises without any reference to their size. Applicability of legal requirements may depend on size of particular operations, but not on size of enterprises.

Development of SME sector in Lithuania is governed by the Law for Development of Small and Medium Business of the Republic of Lithuania. This Law provides SME definition (chapter 1.1) and specifies options of governmental support for SME sector⁷.

The key SME related national programmes and strategies are described further in this section.

Long-term Strategy for Development of Lithuanian Economy to 2015, underlines that small and medium sized business is one of the key drivers for economic development and development of SME sector is one of the key directions of Lithuanian economic policy⁸.

National Strategy for Long-term Development, approved by the parliament of Lithuania in 2002 envisages establishment of social, economic and technological infrastructure for small and medium sized business, development of legal and institutional environment supportive to SMEs, development of a system for co-operation with science and education institutions. It is envisaged that SME sector will have modern infrastructure, will use modern technologies, qualified work force, and will produce competitive, innovative products and services for local and international market. SMEs are expected to generate significant part of GDP, to use resources efficiently and to create new work places. The key strategic directions for SME development specified in this strategy include establishment of new SMEs, regional SME development, increase of qualification of SME employees and improvement of SME infrastructure.

National Strategy for Development of Small and Medium Sized Business specifies the following strategic directions⁹:

- Promotion of innovations and technology development – to support national research programmes focused on commercial use of

⁷ Government of the Republic of Lithuania (2008). Law on Development of SME sector, Vilnius.

⁸ Government of the Republic of Lithuania (2002). Long-term Strategy for Development of Lithuanian Economy to 2015, Vilnius.

⁹ Government of the Republic of Lithuania (2002). National Strategy for Development of Small and Medium Sized Business, Vilnius.

knowledge and technologies, development of SMEs and application of quality requirements as well as certification systems;

- Increase of SME sector competitiveness – to implement programmes supporting technological co-operation among different size enterprises nationally and internationally;
- Promotion of co-operation – to develop easily understandable and network-based international information and business support systems together with other EU countries.

A number of specific measures are specified in this strategy to support establishment of new SMEs, to foster regional development of small and medium sized business, increase of qualification of SME personnel and development of SME infrastructure.

Implementation of this strategy is also supported by Special Programme for Economy Development and Increase of Competitiveness developed by the Ministry of Economy of the Republic of Lithuania in 2008 that specifies measures to create submissive environment for start-up and development of business, for promotion of entrepreneurship and competitiveness of SMEs. Significant attention is given to public services for business development, improvement of quality of these services and for strengthening of financial support for SMEs as well as for training, consultations and other business promotion measures aimed at regional economic and social problems.

National Programme for Improvement of Business Environment “Dawn”. The aim of this programme is to remove unnecessary regulatory burden on business and to develop measures that would help SMEs to remain competitive. One of the key elements of this programme is reduction of bureaucratic procedures and requirements. It is expected that implementation of this programme will reduce bureaucratic burden on enterprises by 30%. To improve business environment, the Dawn Commission has been established. The commission consists of 8 working groups lead by business representatives.

On 17/02/2010 the Government of the Republic of Lithuania approved Lithuanian Strategy for Innovations 2010-2020, developed jointly by the Ministry of Economy and the Ministry of Education and Science. The aim of the strategy is to use governmental resources effectively in development of competitive economy based on state of the art technologies and qualified human resources. This strategy is first comprehensive long-term strategic document that lies down specific objectives, targets and results to be achieved. The following objectives have been specified in the strategy¹⁰:

1. To increase integration of Lithuania in global markets:
 - 1.1. To strengthen knowledge base, to develop integrated science, studies and business centres;
 - 1.2. To participate actively in development of European scientific research area;
 - 1.3. To promote business networking and participation in international innovation networks;

¹⁰ Government of the Republic of Lithuania (2010). Lithuanian Strategy for Innovations 2010-2020.

- 1.4. To participate actively in implementation of international initiatives (Baltic Sea Region Strategy, European Space Agency, etc.);
- 1.5. To promote export of products and services with high value added;
- 1.6. To promote direct foreign investment in products and services having high value added.
2. To support development of creative and innovative society:
 - 2.1. To create education system that increases creativity and innovation;
 - 2.2. To promote entrepreneurship;
 - 2.3. To promote life-long learning.
3. To promote innovations:
 - 3.1. To promote technologic, non-technologic, social and public innovations;
 - 3.2. To support enterprises having high development potential;
 - 3.3. To support innovations oriented towards customer demand and requirements;
 - 3.4. To increase enterprise access to financial resources, to create conditions for commercialisation of scientific research by development of necessary infrastructure and legal mechanisms;
 - 3.5. To develop effective mechanisms for co-operation between business and science including schemes for support of joint projects.
4. To apply systems approach to innovations:
 - 4.1. To ensure institutional co-operation in implementation of national innovation strategy;
 - 4.2. To strengthen cooperation of business and scientific research institutes by their reorganisation;
 - 4.3. To strengthen links between science, studies and business;
 - 4.4. To establish Agency for Science, Innovations and Technologies – institution responsible for co-operation between business and science.

Establishment of the Agency for Science, Innovations and Technologies (Lithuanian acronym – MITA) has been approved by a separate decision of the Government of the Republic of Lithuania on 17/02/2010. The agency has been established by the Ministry of Economy and the Ministry of Education and Science. The Agency will be responsible for implementation of policy for on innovations and technology development and will provide services associated with innovation management. The agency will also be responsible for participation of Lithuanian representatives in international programmes and projects associated with innovations.

2.2 Financial aspects motivating implementation of innovations

Various sources of financial support are available for SMEs in Lithuania to finance innovations. These sources include national and EU funding in the form of various funds in the framework of different programmes. EU support can be provided directly (e.g. EU subsidies) or through programmes

administered on national level, e.g. EU structural funds. National support is provided in accordance to The Law on Development on Small and Medium Sized Business, which states that governmental support is provided in accordance to national, regional and municipal programmes for small and medium sized business development. Support for SMEs can be provided through:

- Tax reductions (in accordance to existing legislation);
- financial support (soft credits, compensation of particular costs, including bank interest rate for credits, quality certification costs, etc.), subsidies for establishment of new work places;
- Consultations, training for SME managers and employees;
- Establishment of business incubators, technology parks and their services.

In accordance to the Law, support specified above can not be provided to for national and municipal companies.

In 2007 – 2013, EU structural support in Lithuania is provided in line with the Strategy for Use of EU Structural Support, approved by the European Commission on 26th April 2007. The Strategy specifies priority investment directions of the EU structural support. There are four action programmes:

1. Human Resource Development Action Programme;
2. Economic Growth Action Programme;
3. Co-operation Promotion Action Programme;
4. Technical Support Action Programme.

For SMEs, Economic Growth Action Programme is perhaps the most applicable, particularly two priority areas of this programme: scientific research and technological development for increase of competitiveness and economic growth, and increase of business productivity and improvement of business environment. The financial measures that could be considered by SMEs in the framework of this programme are the following (Fig. 14):

- “Ideja LT” – support for technical feasibility studies.
- “Intelektas LT” – support for applied scientific research in development of innovative products, services or processes and/ or technological development.
- “Intelektas LT+” – support for scientific research and technological development, prototype development, establishment of laboratories.
- “Inoklaster LT” – support for diffusion of knowledge and technologies, for co-operation between business and science in the area of scientific research and technological development. Support is provided for co-ordination of the cluster.
- “Inoklaster LT+” – support for investments of the SME cluster co-ordinator associated with training and research centre infrastructure.
- “Lyderis LT” – support for acquirement of new productive equipment (high technology). Not applicable for micro-enterprises.
- “E-verslas” – support for optimisation of internal processes (optimisation of production or trade).
- “Procesas LT” – support for implementation of modern management processes or control systems.
- “Naujos galimybes” – support for increase of enterprise productivity. Objective of this measure is to promote enterprises to search for foreign

partners and to increase sales in foreign markets. Not applicable for micro-enterprises.

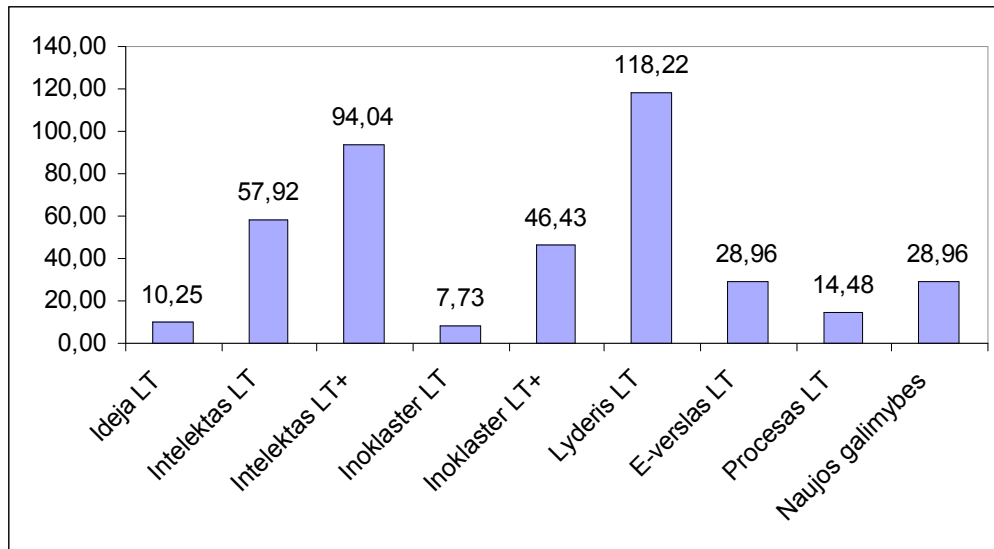


Fig. 14. Funding available for SMEs from the EU structural funds administered in Lithuania, million. EUR (Source: Danilevicius, 2009)

SMEs could also consider possibilities to use Human Resource Development Action Programme. EU structural support is provided through the following measures:

- “Human Resource Development in Enterprises” – support for training of SME managers and employees, training in the work place, development and implementation of modern management systems, implementation of new work organisation practices and methods.
- “State Support for Employment of High Qualification Personnel” – support for employment of scientists and other researchers in micro-enterprises, small and medium sized enterprises with clear knowledge/science profile.

Several national programmes administered by the Ministry of Economy have also been available for SMEs:

- “Programme for Innovations and Increase of Competitiveness”;
- Special Programmes for Implementation of the Strategy for Development of Small and Medium Sized Business;
- Special Programmes for Micro-credits to Small and Medium Sized Business;
- Special programmes for Implementation of Export Development and Promotion.

In 2008, these programmes have been joined under umbrella of “Special Programme for Economic Growth and Increase of Competitiveness”. The programme is developed in line with the Strategy for Use of EU Structural Support in 2007 – 2013 to avoid duplication of the measures funded. This programme is administered by the Ministry of Economy, Lithuanian Economic Development Agency and Joint Stock Company “Investments and Business

Guarantees". The Programme specifies measures to create submissive environment for start-up and development of business, for promotion of entrepreneurship and competitiveness of SMEs. Significant attention is given to public services for business development, improvement of quality of these services and for strengthening of financial support for SMEs as well as for training, consultations and other business promotion measures aimed at regional economic and social problems.

Municipalities also can provide financial support to SMEs from special funds to support small and medium sized business.

To promote development of small and medium sized business and to improve conditions for financing of small and medium sized business, Government of the Republic of Lithuania established Joint Stock Company "Investment and Business Guarantees" (Lithuanian acronym – INVEGA). This institution provides guarantees for credit institutions when loans are taken by SMEs and administers on of the state support mechanisms – partial compensation of the credit interest. Moreover, INVEGA administers provision of very small loans to SMEs.

The following financial instruments are available for SMEs in Lithuania for innovation implementation:

- Subsidies in line with the priorities specified in the Action Programmes for EU Structural Support Strategy Implementation.
- Micro-credits. In August 2006, a trilateral contract between the Ministry of Economy, INVEGA and commercial banks "AB Siauliu bankas", "UAB Medicinos bankas" as well as "AB DnB NORD" concerning micro-loans for SMEs. These loans do not exceed 25000 EUR and are allocated for SMEs. Micro-enterprises are given a priority for these loans.
- Financial guarantees to credit institutions for loans granted to industrial and service enterprises. INVEGA guarantees may be issued for loans to large enterprises as well as for loans obtained by micro, small and medium-sized enterprises (SME) encountering temporary financial problems. Maximum amount of guarantee to one enterprise or to a group of enterprises may not exceed 1.45 million EUR.
- Partial bank interest compensation for SMEs is also provided by INVEGA. For SMEs, 50 % of interest paid could be compensated, however, without exceeding 5% of annual interest. To be eligible to partial compensation of loan interest, the amount of principal may not exceed 720000 EUR.
- Risk capital funds. 28 million EUR have been allocated for this measure from the EU Structural Funds.

A system for identification, development and implementation of preventive environmental innovations

One of the mechanisms that proved to be effective to promote development and implementation of eco-innovations in Lithuania is a system for identification, development and implementation of preventive environmental innovations developed by the Institute of Environmental Engineering, Kaunas University of Technology. Up to 2009, financing of innovation implementation in the framework of this system has been ensured by a special revolving

facility to finance cleaner production investments established in the Nordic Environment Finance Corporation (NEFCO) in 1998. The main objective of this facility was to provide soft loans for the implementation of high-priority investments with rapid payback that yield environmental and economical benefits (“win-win projects”). The facility provided financing directly for a project and the loan was repaid by the company in accordance to the payback period. The maximum loan size was equivalent to about EUR 350 000. Unfortunately, financial support within this scheme is currently not available. More information about this initiative is provided in the chapter 6.4.

As to tax reduction used in Lithuania to support SMEs, the only instrument used is profit tax reduction for micro-enterprises with less than 10 employees and annual income not exceeding 500 000 LTL. For such SMEs, the profit tax is 5%. Other taxes for SMEs are the same as for big companies.

The following tax reductions are used in Lithuania to promote innovations in enterprises¹¹:

- Expenses of enterprises associated with investments in scientific research and technical development are deducted three times from the taxable profit.
- Expenses associated with purchase of long-term property used in scientific research and technical development can be deducted to expenditures in two years.
- Taxable profit is reduced by up to 50 % of expenses associated with investment in production equipment, communication equipment, IT equipment.

Innovation Vouchers in Lithuania

In Summer 2010, Ministry of Economy of the Republic of Lithuania introduced new instrument to promote innovations in SMEs – innovation vouchers to encourage co-operation between business and research institutions. Innovation voucher is a small credit that entitles SME’s to buy R&D expertise or knowledge from research and educational institutions.

Innovation vouchers are more in line with the philosophy of today’s companies, where small, short term projects dominate. So far, an innovation voucher is the best way to support this by affording “quick money”. The main objects of the innovation vouchers in Lithuania are:

- Cooperation between SMEs and R&D institutions;
- Acceleration of knowledge procurement between the research and business and commercialism of the scientific research results;
- Increase the amount of enterprises carrying out innovation activities.

The appeal of the innovation vouchers scheme is related to its simplicity and low administrative burden both for beneficiaries and administrators. The

¹¹ Danilevicius A. Impact of Lithuanian Innovation Policy on Competitiveness of Enterprises and Sustainable Development. Forum „Sustainability Innovations for Industrial Development and Increase of Competitiveness“, 2009.

success of this scheme is linked to effective dissemination activities and provision of assistance to SMEs in using vouchers.

Ministry of Economy of the Republic of Lithuania bears the overall responsibility for the implementation of innovation voucher scheme. The Research, Innovation and Technology Agency undertake the administration of the scheme.

Eligible beneficiaries: micro, small and medium enterprises from all sectors. They can use vouchers to purchase services from knowledge providers – most often public research and technology organizations.

Knowledge providers: innovation vouchers finance intended to finance 20 R&D national institutions, which have provided the list of possible technological, consulting services.

Eligible activities: (1) scientific research (industrial or engineering research); (2) Technological development (experimental development or tentative activities of construction and technologies); (3); consultations on and preparation of documents regarding tenders on industrial property and other documents for the registration of industrial property; (4) studies on technical possibilities.

Types: There are introduced two types of Innovation vouchers in Lithuania: (1) voucher with a value 10 000 Lt with no requirement for own contribution and (2) voucher with a value 20 000 Lt where SME is required to contribute ¼ of this amount from its own resources.

The term of Lithuanian innovation voucher scheme: 2010 – 2013 (expected extension until 2015).

2.3 Enforcement degree

SMEs in Lithuania are often ignorant about the legislation that governs their activities or do not understand what is required. This is particularly true in case of environmental legal requirements. Multiple amendments to improve legal requirements often create confusion and make it difficult for SMEs to understand what compliance involves.

Another limiting factor influencing enforcement degree in SMEs is their limited competence level and capacity. Many SMEs do not have information about modern managerial and technical solutions that could help them improve environmental performance. They also have fewer financial resources to invest in management and technological solutions that could make their operations more environmentally sustainable.

2.4 Market/ business conditions

A survey conducted by Lithuanian statistics department concerning business conditions for SMEs revealed that the most serious problem in 2009 for enterprises was personnel costs (67,8 %), while in 2008 the biggest problem

was availability of qualified work force (72,3 %) (Fig. 13). The latter problem moved to the third place in 2009. Taking into account problems associated with insolvent customers, availability of credit possibilities and decreased profitability, it could be concluded that business conditions for SMEs in 2009 became worse and are difficult primarily because of economic crisis that hit Lithuanian economy at the end of 2008.

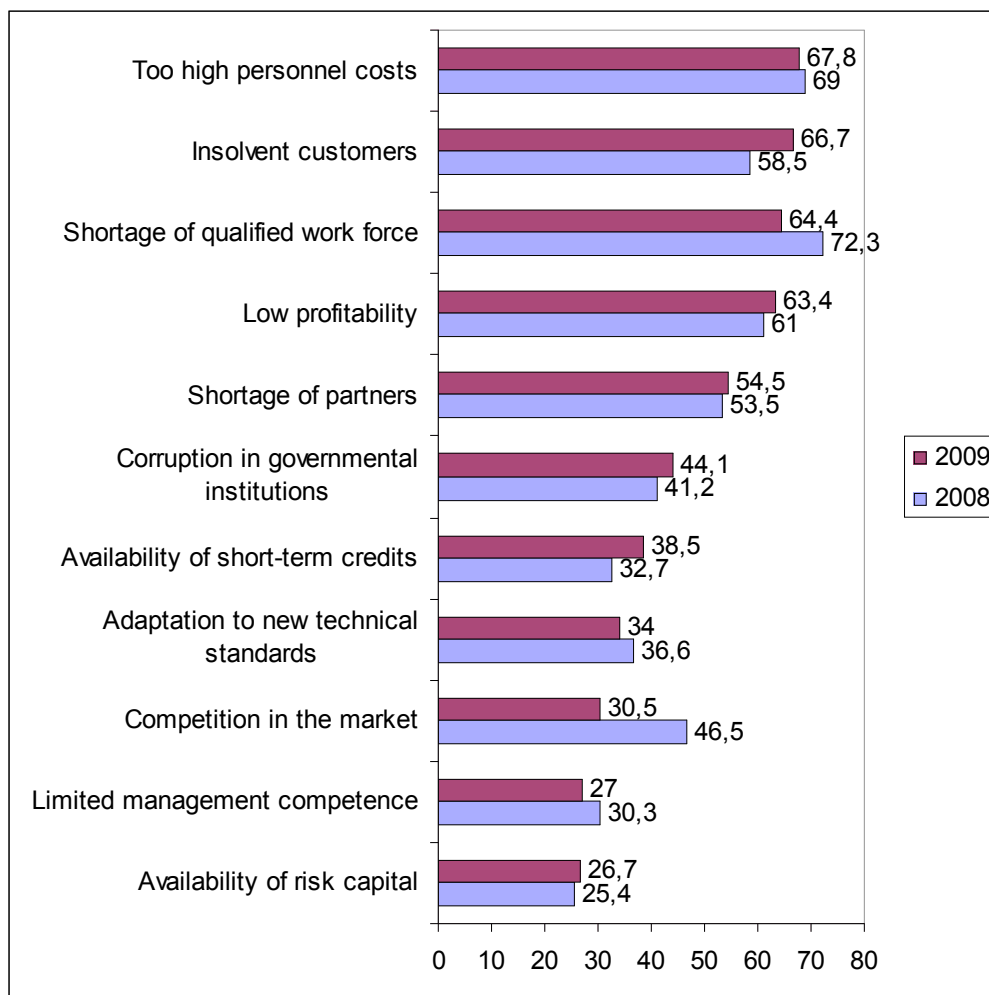


Fig. 13. Difficulties in business conditions for Lithuanian SMEs in 2008 and 2009 (%).

2.5 Intellectual property rights and innovations in Lithuania

The protection of IP rights promote the competence. That is why it could be understood as the indicator of economical and public development. Intellectual property rights are protected by a number of conventions initiated by two major organizations: World Intellectual Property Organization (WIPO) and World Trade Organization (WTO). Lithuania has joined the World Intellectual Property Organization (WIPO), Paris Convention for the Protection of Industrial Property and The European Patent Convention (EPO). The EU

legislation is transposed at the national level laws in order to protect intellectual property rights. There are established equal rights at Community level aiming to simplify and centralize the IP protection system. The substantive advantage of such equal rights would manifest itself as a single registration procedure, due to which all-Community equal protection of intellectual property can be ensured.

There is national program “For raising national economy competitiveness by development of research and technologies” in Lithuania. The main form of industrial property is patent. There are established promotion and maintenance measures to use patents as the intellectual property protection tool in the Lithuanian industry. Main forms of patent promotion and support:

- Tax incentives – EU Structural Funds for 2008 – 2013 and National Funds
 - Expenditures for R&D reduce taxable income 3 times;
 - Amortisation process is reduced to 2 years;
 - Tax Relief for Investments into new Technologies up to 12% of Tax Amount (under preparation)
- Financial assistance: Compensation of patenting related expenses could be budgeted as following: payment in advance; payable at sight of the bill; reimbursement of expenses. Patent Expenditures can be compensated up to 95% for European patent or Patent Cooperation Agreement. The budget for compensation was 29 000 EUR in 2007; 144 800 EUR – 2008; 235 400 EUR – 2009 and 240 600 EUR – 2010.

There are three ways to obtain patent in Lithuania, according to the Patent Law: State Patent Bureau; Patent Cooperation Treaty; European Patent Convention.

There are currently three ways to register exclusive rights to a trademark in Lithuania:

- National path - by a direct application to the State Patent Bureau;
- Regional path - under the EU Council Regulation on the Community trade mark, a trademark registered as a Community trademark with the OHIM is protected in Lithuania;
- International path - the Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks covers Lithuania.

The following bodies are responsible for intellectual property protection in Lithuania: Council of Copyright and Related Rights of Lithuania; State Plant Varieties Testing Centre; Non-state copyright and related rights collective administration association (LATGA-A) (AGATA); Customs Department; Competition Council; Patent attorneys of the Republic of Lithuania; Lithuanian Criminal Police Bureau; Ministry of Culture; State Patent Bureau; Ministry of Justice.

3. Methodology

The first and second chapters of report have been written on the basis of statistical information and several studies conducted by the Lithuanian Statistics Department and other organisations as well as various national programmes, and other documents.

The SME needs, barriers and incentives for eco-innovation development and implementation have been identified using personal communication with SME representatives, consultations with governmental authorities having links to SMEs and innovations. As a first step, a SWOT analysis has been carried out. Additionally, a small survey has been conducted by the Institute of Environmental Engineering, Kaunas University of Technology. Finally, personal experience of the authors of this report in development and implementation of preventive environmental innovations in Lithuanian SMEs has also been used.

4. Needs of SMEs in terms of eco-innovation development and implementation

4.1. SWOT analysis concerning development and implementation of eco-innovations in Lithuanian SMEs

Strengths

- Sufficiently qualified and educated technical personnel in SMEs, increased responsibility for personal actions;
- Well educated work force in SMEs;
- Developed and tested system/ methodology for cleaner production innovation development and implementation in Lithuania,
- Sufficient scientific potential in universities and research organisation;
- Sufficiently developed infrastructure of business consultations;
- Many SMEs believe that it is not possible to be competitive without development/ implementation of innovations;
- Suppliers increasingly demand implementation of innovations;
- Availability of financing mechanisms for innovation implementation.

Weaknesses

- SMEs do not have sufficient financial and human resources to develop innovations on their own;
- Lack of support (including financial) for innovation development;
- Lack of competence concerning eco-innovations in governmental institutions and SMEs;
- Innovation development in SMEs is not systematic, reactive approach is still widely used;
- Lack of incentives for eco-innovation development and implementation in SMEs;
- Weak co-operation among SMEs and other stakeholders, particularly between SMEs and research organisations;
- A system of research is not sufficiently oriented towards applied research;
- Weak interdisciplinary co-operation in terms of scientific research;
- Lack of understanding of the environmental problems in SMEs.

Opportunities

- Development of competence in eco-innovation development;
- Innovations is popular topic and there are good opportunities for development of innovation culture in SMEs;
- Increase of sustainability performance in SMEs by implementation of economically beneficial preventive eco-innovations;
- Reduction of natural resource consumption for production unit and increase of the country's SME sector internationally;
- Big potential for eco-innovations in many SMEs due to inefficient production processes and natural resource consumption as well as poor productivity;
- Support for implementation of international agreements, particularly in the environmental area;

- Attraction of foreign capital for modernisation of SMEs;
- Increasing understanding among SMEs that innovation implementation will result in increased efficiency of the operations.

Threats

- Delayed capacity building for eco-innovations will not enable utilisation of eco-innovation potential;
- Pressure on SMEs to solve environmental problems urgently may jeopardise implementation of eco-innovations;
- Lack of co-operation among different stakeholders. Particularly among SMEs, research organisations and innovation support programmes may hinder eco-innovation development and implementation;
- Eco-innovations, and more generally innovations are considered by some SMEs to be risky, particularly when product changes are concerned;
- Limited product development in Lithuanian SMEs limits product innovation development;
- Adaptive innovations (i.e. adaptation of production methods developed and tested in other countries) prevail in SMEs,
- Possibly ineffective use of EU structural funds allocated for innovation implementation;
- Weak demand for more environmentally friendly products due to low environmental awareness of the society.

4.2. Financing of eco-innovation development and implementation

4.2.1. Development projects

In management of environmental/ sustainability aspects, reactive approach is still widely used. Enterprises often take action when particular problem surfaces. However, many of such problems could be prevented when proactive (preventive) approach is used. Moreover, preventive approaches, e.g. cleaner production methodology in some cases enable to eliminate the need for pollution control (end-of-pipe) technologies or to reduce capacity of pollution control equipment. This could lead to significant financial savings in addition to reduced impact to the environment and possibly improved work conditions and improved product quality.

Additionally, decision-makers in SMEs are often “too quick” in finding solutions to particular problems. Seldom real causes of a problem are analysed as solution often seems to be “obvious”, e.g. when new legal requirement concerning emission of particular pollutant is introduced, decision makers are often tempted to go the easiest, but not the most efficient and economically viable way – to look for pollution control technology that would enable to capture pollution. Additional data collection and analysis could help to identify more alternatives to solve the problem, e.g. material substitution to eliminate the pollutant in concern (product innovation), production process modification to reduce pollutant generation, or even better control of the process as a result of non-technical innovation (Fig. 15). Theoretical statement that there are many ways to solve any particular problem has been proved in practice in a number of projects implemented jointly by industrial enterprises and Institute

of Environmental Engineering, Kaunas University of Technology. Finally, enterprises often underestimate performance improvement potential from small innovations that are easy implement and often do not require significant financial resources. Innovation is often considered by SME representatives in its narrow sense as development and implementation of new advanced technologies and introduction of conceptually new products.

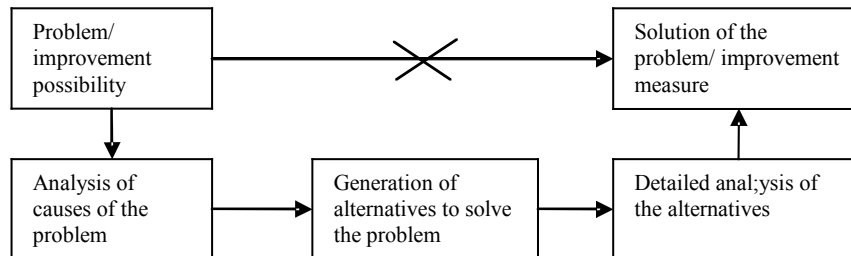


Fig. 15. A path for effective utilisation of performance improvement options/ identification of eco-innovations

Therefore, there is clear need to intensify use of information dissemination about eco-innovations and proactive approach in solving environmental problems and associated capacity building activities. This would also promote generation of new eco-innovation ideas rather than just adapting technologies or methods developed elsewhere (which is by no means the bad approach in many cases).

When asked about innovations, enterprises often believe that innovation development is the role of research organisations. Despite the fact that a system of research in Lithuania is not sufficiently oriented towards applied research and there is a need for closer interdisciplinary co-operation in scientific research so much needed for eco-innovation development, it should be stressed that research organisations generate knowledge and only joint efforts of business and science could lead to desired result. In the context of eco-innovation development, there is a need to promote closer co-operation between SMEs and research organisations.

When the most efficient solution for a problem is identified SMEs usually need assistance in preparation of a loan application including assistance in calculation of cost savings and environmental benefits. Assistance to the applicant in communication with the financing institution and preparation of loan documentation might also be needed.

4.2.2. Capital for investments in eco-innovations

As presented in the chapter 2.2, a number of different options are available for SMEs to secure financing for implementation of innovations. However, a survey carried out among participants of SPIN project seminar participants revealed that most of SMEs know about opportunities to receive external financing from the innovation implementation support measures, but most of them were reluctant in applying. Data presented in Table 3 confirms that

popularity of the financing measures is far too low and their effectiveness could be questioned.

However, the main reason for such low interest from SMEs in available financing opportunities is perhaps not the structure or administrative side of these measures, but lack of developed innovations ready for implementation in SMEs.

Table 3. Application number and finance use in nationally administered innovation support measures (EU structural funds) (Source: Danilevicius, 2009).

No.	Title of the measure	Assigned sum (mln. LTL)	Number of applications	Contracts signed	Used sum
1.	Idėja LT	35,4*	152	63	5,7
2.	Intelektas LT	200,0*	102	90	97,1
3.	Intelektas LT+	324,7*	39	21	36,6
4.	Inoklaster LT	26,7*			
5.	Inoklaster LT+	160,3*			
6.	Inogeb LT -1	32,6	27	14	22,2
7.	Inogeb LT- 2	99			
	Total:	861,2	320	188	161,6

Taking into account that most of Lithuanian SMEs do not have sufficient financial and human resources to develop eco-innovations on their own, there is a clear need for external technical support. Such support could be provided by research organisations, particularly when there is a need for a thorough analysis of enterprise's activities, products and services, identification of eco-innovation potential and generation of performance improvement ideas. When SME has clear idea for eco-innovation, technical assistance from consulting organisation having adequate capacity and experience might be sufficient to turn the idea into an investment project. In an ideal case, financing of these services (external technical assistance) should be at least partly covered from public funding sources. This would also promote closer co-operation between SMEs and research.

Financial support for capacity building activities in SMEs is another important need.

4.3. Competences

Generally, SMEs in Lithuania have sufficiently qualified and well educated technical personnel. This is a good pre-condition for eco-innovation development and implementation. However, many SMEs lack of understanding of environmental problems and sometimes have limited information (particularly when it comes to details) concerning their activities,

products and services from the perspective of sustainable development or more specifically, performance improvement potential. SMEs also lack methodological competence in terms of identification of eco-innovation potential and eco-innovation development.

Therefore, there is a need for capacity building activities in the country, primarily targeted at SMEs. The key activity in capacity building is training programmes. Both long-term training and short-term training programmes are important in this regard.

Experience of cleaner production programmes in Lithuania demonstrated that a long-term training programmes emphasising on-the-job training are the most effective for capacity building in enterprises. There is a need for long term training programmes for SMEs that combines theoretical training and practical work. Such programmes would result in a number of eco-innovations ready for implementation. Practical case studies could also be developed during such programmes and used in information dissemination activities to further promote eco-innovation development and implementation in the country.

Short-term training programmes are needed to increase awareness about eco-innovations and their potential in SMEs. Such training programmes could be organised for SME managers and representatives from governmental institutions.

To achieve wide-scale development and implementation in Lithuanian SMEs, there is a need to strengthen information output about eco-innovations and their benefits. Information could be targeted at specific audiences, mainly SMEs as well as governmental institutions. Seminars, workshops and conferences focusing on information dissemination and exchange as well as other information dissemination means could be better utilised for this purpose.

4.4. Business and market

In Lithuania companies consider environmental protection/ sustainable development issues mainly due to changing business and market requirements. The process of change in behaviour/ attitude is mainly driven by external factors. Therefore, companies apply certain tools, but these tools often applied in a formal way and are not fully utilised. This is the case, e.g. in terms of environmental management systems (EMS). Companies implement EMS in accordance to the ISO 14001 standard requirements, but often these systems or only "on paper" and do not result in real change of management effectiveness or improved environmental performance.

It could be concluded that incentives provided by business and market to initiate environmental work/ development and implementation of environmentally sound innovations in companies are sufficient at the moment taking into account a serious need for internal incentives. This problem could only be solved by using information dissemination and capacity building activities.

4.4. Intellectual property rights

Generally, in the context of innovation development, the issues related to intellectual property rights are of particular importance. However, in the current situation IPR issues are far from the most important Lithuanian SME needs when it comes to development and implementation of sustainable innovations.

5. Barriers

Theoretically, SMEs should focus more on eco-innovation development and implementation and to utilise available opportunities for performance improvement. However, process of eco-innovation development and implementation is too slow due to a number of internal and external barriers.

Internal barriers in SMEs could be divided in two main categories:

- Barriers related to the start-up of the eco-innovation implementation, e.g. lack of information about eco-innovations and benefits their implementation could provide, fear that change of production processes or material substitution will result in reduced product quality, thinking that positive changes could be achieved only with large investments.
- Barriers that occur in the process of eco-innovation development and implementation, e.g. underestimation of incremental innovations that do not require large investments, lack of information about processes in enterprises, lack of human resources and competence, problems associated with financing of investment projects, viewpoint of employees that they can non influence decisions related to production processes.

Experience in Lithuanian SMEs shows that internal barriers such as lack of information, human resources and competence are particularly important. However, weakness of external driving forces is also very important aspect in the context of eco-innovation development and implementation process in the country.

5.1. Financing

As discussed in the chapter 2.2, several options exist for SMEs in Lithuania to receive external financing for innovation implementation. While effectiveness of these options could be questioned in terms of administrative requirements, the main barrier is lack of developed innovations ready for implementation in SMEs. None of the available financing support programmes/ measures designed to promote innovation and to increase their implementation provides support for innovation development. It could be concluded that the main problem is innovation development, not necessarily availability of external financing for innovation implementation, while this is also could be a problem in some cases.

In addition to the fact that SMEs have limited financial resources available, eco-innovations compete with other investment alternatives and in some cases are not considered for implementation due to short-term thinking and focus on short-term economic gains. Moreover, in some cases economically feasible eco-innovation ideas might be rejected because of incomplete accounting when full environmental costs are not calculated. Lack of competence or even basic information about eco-innovations and their benefits is a key problem in this regard.

5.2. Competences

In terms of competences for eco-innovation development and implementation, the starting point for discussion is the fact that SMEs are not sufficiently aware of the environmental impacts of their business activities. Existing data show that a large part of SMEs tends to underestimate their environmental impacts. Experience of the Institute of Environmental Engineering, Kaunas University of Technology from the projects implemented in co-operation with SMEs shows that competence of SMEs in the environmental area is limited. Without information about their environmental impacts and associated production inefficiencies, e.g. in energy and natural resource use, SMEs will be neither motivated nor able to make decisions that would improve their environmental performance. The saying that “what is not measured can not be managed” is particularly true in the case of SMEs.

It could be stated that one of the key factors affecting behaviour of SMEs in the area of eco-innovation development and implementation is their limited competence level and capacity to adopt approaches of environmentally sustainable industrial development. Many SMEs do not have information about modern managerial and technical solutions that could help them improve environmental and economic performance. They suffer from an overall lack of managerial and technical skills and human resources to perform certain tasks, particularly if these tasks are believed to be outside of the SMEs core business. They also have fewer financial resources to invest in management and technological solutions that could make their operations more environmentally sustainable. Finally, SMEs care much less about their environmental image than large enterprises.

The lack of resources, together with the lack of technical expertise and skills, clearly contribute to the sceptical attitude SMEs show towards the potential benefits, cost savings and customer rewards associated with environmental improvements. Many SMEs still believe that activities related to environmental protection are costs without any benefits.

For those SMEs that would like to increase competence in the field of eco-innovation development, currently there are no suitable training programmes available.

5.3. Business and market

A survey conducted by Lithuanian statistics department concerning business conditions for SMEs revealed that the most serious problem in 2009 for enterprises was personnel costs (67,8 %), while in 2008 the biggest problem was availability of qualified work force (72,3 %) (Fig. 13). The latter problem moved to the third place in 2009. Taking into account problems associated with insolvent customers, availability of credit possibilities and decreased profitability, it could be concluded that business conditions for SMEs in 2009 became worse and are difficult primarily because of economic crisis that hit Lithuanian economy at the end of 2008.

5.4. Other barriers

Lack of human resources in terms of capacity is also a significant barrier for eco-innovation development and implementation in Lithuanian SMEs. Experience of the Institute of Environmental Engineering, Kaunas University of Technology from projects implemented in co-operation with SMEs shows that this is a serious barrier that limits SME involvement in the projects. Companies often preoccupied with doing business as usual and do not have personnel available for “additional” activities.

Another important barrier for eco-innovation development is reactive approach still prevailing in most of Lithuanian SMEs when it comes to management of environmental/ sustainability aspects. Action is often taken when SME has no other choice or possibility to postpone decision. Additionally, decision-makers in SMEs are often “too quick” in finding solutions to particular problems, without a thorough analysis of problem reasons and consideration of different alternatives.

Weak co-operation between SMEs and other stakeholders, particularly research organisations could also be considered as a barrier for eco-innovation development.

In terms of product innovations, a barrier is limited product development activities in a number of Lithuanian SMEs as they produce products under strict requirements of their customers and can not influence product development process.

Integrated Pollution Prevention and Control permits has certainly had a positive impact towards more sustainable production.

The key issue in regards to legal requirements is their enforcement, which is a complicated issue due to frequent changes of legal requirements in Lithuania over the last years.

6.2. Market-oriented schemes

Market-oriented schemes targeted at SMEs have been presented in the chapter 2.2. Mechanisms such as subsidies, micro-credits, financial guaranties, risk capital funds in Lithuania are administered by the „UAB Investicijų ir verslo garantijos“ (INVEGA), e.g. from the beginning of its activities in 2001 INVEGA has already issued 1 956 guarantees for loans taken by SMEs with the amount of guaranteed loans totalling LTL 851 million and of guarantees – LTL 544 million¹³.

Unfortunately, information concerning effectiveness of market-oriented schemes concerning eco-innovation development and implementation in SMEs is not available.

6.3. Public procurement

Public procurement procedures in Lithuania are currently regulated by the new version of the Law of the Republic of Lithuania on Public Procurement No. X-471 (December 2005), which came into force on 31 January 2006. This Law establishes the rights, obligations and responsibility of participants in the procurement process, as well as the procedure for the control of public procurement and settling of disputes. It contains provisions of possibilities to integrate sustainable development items in public procurement procedures (defining technical specifications, qualification requirements, tender assessment criteria and contract provisions)¹⁴.

The Government of the Republic of Lithuania by Decree No. 804 adopted National Green Procurement Implementation Programme 2007-2011 on August 29, 2007. The green procurement is defined, the aims and results, assessment criteria are established, supervision and implementation tools are foreseen in the Programme.

For implementation of the National Green Procurement Implementation Programme, Minister of the Environment of the Republic of Lithuania by his Decree No. D1-697 (December 22, 2007) confirmed the list of products for which the environmental criteria in public procurement procedures should be applied since 2008 and approved the environmental criteria for such products.

Although the green product procurements cover only 5% of all public procurement, the implementation of environmental criteria is not a voluntary incentive. According the National Green Procurement Implementation

¹³ INVEGA, <http://www.invega.lt/en/>

¹⁴ Government of the Republic of Lithuania (2005). The Law of the Republic of Lithuania on Public Procurement No. X-471, December 2005, Vilnius.

Programme, „green“ procurement must reach the level of not less than 25% till the end of 2011 (Fig. 17)

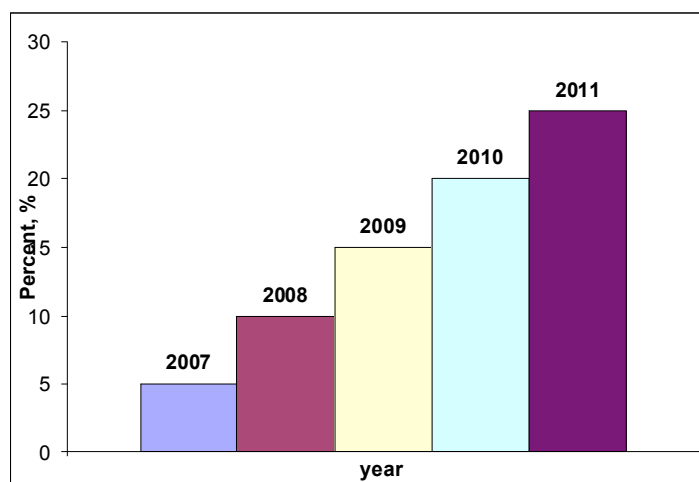


Fig. 17. Green product procurement level according to National Green Procurement Implementation Programme 2007-2011¹⁵.

As in case of market-oriented shames, information concerning impact of public procurement on eco-innovation development and implementation is not available.

6.4. Financial and institutional support measures

Public subsidies could be an important tool for eco-innovation development and implementation in SMEs. However, this opportunity in Lithuania is largely unexplored. Some tax reductions are used to promote innovations in enterprises, but information concerning their effectiveness is not available.

One of the mechanisms that proved to be effective to promote development and implementation of eco-innovations in Lithuania is a system for identification, development and implementation of preventive environmental innovations developed by the Institute of Environmental Engineering, Kaunas University of Technology. Up to 2009, financing of innovation implementation in the framework of this system has been ensured by a special revolving facility to finance cleaner production investments in Lithuania, Latvia, Estonia and the Russian Federation, established by the Nordic Environment Finance Corporation (NEFCO) in 1998.

The main objective of this facility was to provide soft loans for the implementation of high-priority investments with rapid payback that yield environmental and economical benefits (“win-win projects”). The facility provided financing directly for a project and the loan was repaid by the company in accordance to the payback period. The maximum loan size was

¹⁵ Ministry of Environment of the Republic of Lithuania (2007). National Green Procurement Implementation Programme 2007-2011, Vilnius.

equivalent to about EUR 350 000. Unfortunately, financial support within this scheme is currently not available. To date, up to 52 projects have been financed by NEFCO in the framework of this system. Average pay-back period of the implemented projects is ~ 3 years.

The system is based on preventive strategies; the process of innovation generation and development is carried out jointly by researchers and industry from the very beginning; the system is sophisticated "one stop shop" comprising innovation generation, assessment, financing, implementation, and monitoring stages. The system was presented/ applied in the framework of UNEP, UNIDO and EU projects in companies in Zimbabwe, Tanzania, Vietnam, Uganda, Nicaragua, Guatemala, China (Liaoning province). The system has been acknowledged by the „Energy Globe 2008 National Award" and Award by Lithuanian Ministry of Environment in the category of "International cooperation 2008".

The success of this initiative in Lithuania is to a considerable degree the result of availability of a local institution that can support the identification of cleaner production opportunities and the elaboration of loan applications.

In Summer 2010, Ministry of Economy of the Republic of Lithuania introduced new instrument to promote innovations in SMEs – innovation vouchers to encourage co-operation between business and research institutions. Innovation voucher is a small credit that entitles SMEs to buy R&D expertise or knowledge from research and educational institutions (see 2.2).

The first call for application have been announced at the 1 of July 2010 with the purpose to share innovation vouchers with the total value 1 000 000 LTL. There was a great interest from the companies, and the intended sum has been apportioned between 87 SMEs over three weeks. 62 contracts were made with the companies for the voucher value 10 000 (whereof – 24 micro, and 23 small companies, 14 – medium enterprises and 1 entrepreneur with the individual activity). 25 contracts were made with the companies for the voucher value 20 000 Lt. (whereof – 13 micro, 8 small and 4 medium enterprises).

The most popular institutions indicated in the proposals are Kaunas University of Technology and Vilnius University.

6.5. Awareness raising and demonstration measures

Awareness raising/ capacity building activities in the area of eco-innovations/ cleaner production (CP) in 1993 could be considered as a beginning of sustainable production development in Lithuania. These activities appeared to be in line with the concept of basic capacity level (BCL) for cleaner production defined by Organisation of Economic Co-operation and Development (OECD) in 1996, when the Task Force for the Implementation of the Environmental Action Programme (EAP) in Central and Eastern Europe (CEE) endorsed the Work Programme on Environmental Management in Enterprises. The basic capacity level was defined as the level which is needed for further dissemination of the CP concept and principles throughout industry and

society by the host country. Specifically, it involves creating: (i) an active core of CP advisors and trainers; (ii) a set of CP case studies, demonstration projects and model business plans; (iii) a functioning CP Centre or Centres; (iv) training materials in the local language; (v) cleaner production principles, included in university course curriculum, and (vi) a monitoring framework and quality assurance. OECD assessment carried out in 1998 concluded that Lithuania was among a few CEE countries that have achieved the Basic Capacity Level¹⁶.

A role of *cleaner production centre* in Lithuania was played by the Institute of Environmental Engineering (APINI), Kaunas University of Technology. This institution co-ordinated most of the programmes/ projects related to sustainable consumption and production in Lithuania and supported by foreign donors¹⁷. When foreign donor support diminished, APINI continued to play an active role in further development of preventive approaches and assisted Lithuanian industry to improve environmental and economic performance.

The key objective of *demonstration projects* was to show the potential of CP concept in pilot enterprises and subsequently to introduce the concept to a broader number of enterprises. Generally, the projects show economic and environmental benefits of CP measures. Most of CP demonstration projects in Lithuania have been implemented in the framework of two programmes: (i) World Environment Centre (WEC) Pollution Prevention Programme and (ii) Norwegian Cleaner Production programme. A number of technical improvements that resulted in environmental and economic benefits have been implemented, but the lack of follow-up and lack of involvement of local experts (particularly in case of WEC programme) in implementation of these measures did not spark the expected multiplier effect. Lithuanian experience showed that achieving desired objectives required more than providing cleaner technology hardware. Nevertheless, case studies developed in demonstration projects have been valuable source of reference for further cleaner production activities.

Training programmes have been a core of cleaner production and other projects related to sustainable consumption and production in Lithuania. In principle, two types of training programmes have been used: (i) long-term training programmes and (ii) short-term training programmes.

In terms of long-term training programmes, within the Norwegian CP programme, prior to receiving their certification, trained experts had to prepare reports which include three types of projects: (i) zero investment; (ii) payback on investment of less than 1 year; and (iii) long-term measures with larger investments which could be considered after options (i) and (ii) have been exhausted. Systematic environmental, economic and technical feasibility analysis of identified CP options proved to be extremely important in ensuring that the priority options were selected and implemented.

¹⁶ OECD, EAP Task Force (1998). Progress in Achieving Basic Capacity Level for Cleaner Production in CEEC/NIS, Paris.

¹⁷ Staniskis J., Varzinskas V., Arbaciauskas V. (2008). Sustainable consumption and production in Lithuania, Environmental research, engineering and management, Kaunas, Technologija. No. 3(45)

The key success factor for these programmes was well balanced combination of theoretical training (as series of seminars) and practical work in companies between the training seminars.

Short-term training programmes have been mainly used for senior managers of enterprises and representatives of governmental institutions.

Finally, an important activity to promote application of preventive environmental measures was *information dissemination* targeted at specific audiences, mainly industry as well as national and local governmental institutions. A number of seminars, workshops and conferences focusing on information dissemination and exchange have been organised

After donor support for cleaner production activities has been terminated, Institute of Environmental Engineering continued co-operation with enterprises. Information about economic and environmental benefits from cleaner production innovations implemented in 1993-2009 is presented in the tables 4 and 5.

Table 4. Cleaner production innovations in different industrial sectors (1993-2009)

No.	Sector	Number of companies	Number of implemented cleaner production innovations	Investments in cleaner production, Thousands LTL	Economic benefits of cleaner production innovations, thousands LTL/ year
1	Production of textile products	15	41	10 640	8 927
2	Production of food and beverages	14	28	9 772	6 535
3	Supply of electricity and heat energy	8	19	18 958	8 699
4	Production of chemicals	6	13	1 500	1 700
5	Production of machinery and equipment	6	6	3 980	1 842
6	Furniture production	6	11	4 914	1 796
7	Production of other non-metal and mineral products	4	7	2 563	1 489
8	Production of wood products	4	7	5 415	4 075
9	Transport and communication	4	7	1 073	944
10	Production of metal products, except of	3	9	1 422	1 251

No.	Sector	Number of companies	Number of implemented cleaner production innovations	Investments in cleaner production, Thousands LTL	Economic benefits of cleaner production innovations, thousands LTL/ year
	machinery and equipment				
11	Oil product terminal	3	3	1 771	585
12	Production of leather and leather products	2	3	629	779
13	Production of radio, television and communication equipment	2	6	5 264	2 115
14	Production of medical, precise and optical equipment	2	6	1 246	525
15	Production of refined oil products	1	3	4 484	1 331
16	Production of glass and glass products	1	1	742	345
17	Agriculture and forestry	1	1	2 295	707
18	Communal services	1	4	416	171
19	Supply of gas and water	1	1	395	160
20	Washing of textile and fur products and dry cleaning	1	1	1 415	377
	Total:	85	177	78 895	44 354

Table 5. Environmental benefits from cleaner production innovations implemented in 1993-2009 in different sectors of Lithuanian economy

	Environmental areas:	Environmental benefits	units/ year
1	Reduction of resource consumption/ losses:		
1.1	Electricity	29 940	MWh
1.2	Heat energy	237 205	MWh
1.3	Chemicals and additives	2 289	t
1.4	Water	811,1	Thousand m ³
1.5	Oil	89,9	t

	Environmental areas:	Environmental benefits	units/year
1.6	Fuel	448,1	t
1.7	Fuel consumption, etc. from heat energy saving or from reduction of heat energy losses in production and supply	22 071,61	tne
2	Reduced impact to the environment:		
2.1	Emissions to the atmosphere from stationary pollution sources	3 093,95	t
2.2	Emissions of greenhouse gasses (CO ₂)	79 759,53	t
2.3	Emissions to the atmosphere from mobile pollution sources	183,98	t
2.4	Wastewater volume	774	Thousand m ³
2.5	Wastewater pollution	521,21	t
2.6	Hazardous waste	621,5	t
2.7	Non-hazardous waste (or waste transformed into raw material for production of other products)	116 108	t
3	Indirect impact to the environment from electricity and heat energy saving (energy produced elsewhere):		
	Reduction of greenhouse gas emissions (CO ₂): In accordance to natural gas emission factor (in accordance to fuel oil emission factor)	7 107,46 (22 616,36)	t

In terms of awareness raising and competence building, role of universities is particularly important in a long term perspective. While particular sustainable consumption and production topics have been included in the curriculum of Lithuanian universities (primarily Kaunas University of Technology) in 1998, first M.Sc. programme in the area of environmental management and cleaner production has been introduced in 2002. The M.Sc. students are provided with: (i) skills to identify and assess the effects of human activity on the environment; (ii) knowledge of national and international environmental policy and legislation and the management of environmental issues in industrial and service systems; (iii) knowledge of technical systems, strategies and technologies for applying the principles of cleaner production in developing products and production systems; and (iv) practical experience in implementing preventive environmental measures¹⁸.

6.6. Intellectual property rights and innovations

Intellectual property rights protect inventions, trademarks, creativity and resourcefulness. Industrial intellectual property is the ownership of monopolistic rights to technical or aesthetic inventions as well as exclusive marks. It bears relation with patents of inventions, design, industrial objects' samples and references of the place of origin or names. Intellectual property and its protection are important not only for promoting innovation and

¹⁸ Staniskis J., Arbaciauskas V. (2003). Industrial ecology in university curriculum: new M.Sc. Programme in Environmental management and Cleaner Production, Clean Technologies and Environmental Policy, Springer, Volume 5, Number 2.

creativity, but also for developing employment and improving competitiveness, determining the oneness of the company in the market. The management of intellectual property has to be planned and the investments to the IP rights should be as strategic movement of the companies having the ambitious to develop and gain or protect exclusive niche in the market.

There is national program “For raising national economy competitiveness by development of research and technologies” in Lithuania. The main form of industrial property is patent. There are established promotion and maintenance measures to use patents as the intellectual property protection tool in the Lithuanian industry. Main forms of patent promotion and support:

- Tax incentives – EU Structural Funds for 2008 – 2013 and National Funds
 - Expenditures for R&D reduce taxable income 3 times;
 - Amortisation process is reduced to 2 years;
 - Tax Relief for Investments into new Technologies up to 12% of Tax Amount (under preparation)
- Financial assistance: Compensation of patenting related expenses could be budgeted as following: payment in advance; payable at sight of the bill; reimbursement of expenses. Patent Expenditures can be compensated up to 95% for European patent or Patent Cooperation Agreement. The budget for compensation was 29 000 EUR in 2007; 144 800 EUR – 2008; 235 400 EUR – 2009 and 240 600 EUR – 2010.

It is proved that the 4 sectors of Textiles and Clothing, Leather, Footwear and Furniture face a fierce competition in their everyday struggle for surviving; especially from other continents like Asia or South America. Small businesses which need to protect their valuable Intellectual Property (IP) can use 4 new international accredited IP Sectoral Guides “Intellectual Property, A business tool for SMEs” published in EU official languages. The Guides explain in an understandable way what the IP rights could mean for a SMEs, how to use it and find out more about it, including also the issues of counterfeiting.

6.7. Strategic planning/ oversight

A number of national programmes have been developed in recent years to promote innovations in Lithuanian enterprises, including SMEs. In 2008, these programmes have been joined under umbrella of “Special Programme for Economic Growth and Increase of Competitiveness”. The programme is developed in line with the Strategy for Use of EU Structural Support in 2007 – 2013.

In February 2010, the Government of the Republic of Lithuania approved Lithuanian Strategy for Innovations 2010-2020. The aim of the strategy is to use governmental resources effectively in development of competitive economy based on state of the art technologies and qualified human resources. This strategy is first comprehensive long-term strategic document that lies down specific objectives, targets and results to be achieved.

7. Conclusions and recommendations

1. SMEs play a major role in the economic growth and provide most of new jobs. At the same time, SMEs pose serious environmental problems due to their high numbers and their cumulative effect. To survive in the rapidly changing business environment, SMEs have to be flexible, dynamic and open. In this context, there is an evident need for more intensive development and implementation of eco-innovations.
2. To increase eco-innovation development and implementation, there is a need to intensify the information flow on eco-innovations and support for application of a proactive approach in solving environmental problems in SMEs. Increased co-operation between business and research organizations is of particular importance in this regard.
3. Several financing mechanisms in the framework of the EU structural funds are available for SMEs in Lithuania to finance innovations. However, most of SMEs are reluctant to use these financial support mechanisms due to lack of developed innovations ready for implementation. None of the available financing mechanisms provides support for innovation development. The focus should be placed on eco-innovation development.
4. Experience in Lithuanian SMEs shows that internal barriers such as lack of information, human resources and competence are particularly important. However, weakness of external driving forces is also very important aspect in the context of eco-innovation development and implementation process in the country.
5. Overcoming barriers is a matter of several critical factors, including stronger external incentives to stimulate motivation and commitment of SMEs for eco-innovation development and implementation; sufficient technical and financial support from external stakeholders to compensate lack of competence and resources in SMEs; and effective flows of information from external stakeholders
6. Since 1993, significant progress has been made towards more sustainable consumption and production practices. Despite positive results, cleaner production, eco-design and other preventive practices are still not considered by industry and other stakeholders as primary option. It has been practically proved that investments in eco-innovations increase profitability for industry by increasing efficiency, productivity and product quality, cutting the costs for resources, reducing the need for large investments in pollution abatement equipment. Nevertheless, this area still lacks sufficient attention from industry, financial sector and governmental institutions.

The following recommendations could be proposed taking into account findings presented in this report:

1. In terms of legal requirements and market-oriented schemes, it is recommended to conduct periodic assessment of their effectiveness in promoting development and implementation of eco-innovations and relevant modification.
2. To strengthen external driving forces, it is recommended to assess possibilities for applying simplification for control of legal compliance for companies developing and implementing eco-innovations.

3. Taking into account that the main internal barrier for development and implementation of eco-innovations and other sustainable industrial development measures is lack of competence in the SMEs, competence strengthening and technical support to SMEs in development and implementation of eco-innovations should become a priority.
4. As a first step, it is recommended to organise long-term training programmes for representatives of SMEs (duration of 6-12 months), covering both theoretical training and practical development of eco-innovations. Such programmes could be focused on particular sectors of industry or mixed industry groups. Experience shows that such training programmes are most effective to strengthen competence in enterprises.
5. To familiarise top managers of SMEs and representatives of governmental/ financial institutions with eco-innovation development methodology and potential benefits, it would be meaningful to organise a series of short-term training programmes (duration up to 2 days). Such short-term training programmes would promote development and implementation of eco-innovations in the country.
6. In the long-time perspective, promotion and establishment of interdisciplinary sustainable industrial development study programmes at university level is particularly important. Currently, establishment of such studies is problematic, because the focus of higher education is on study programmes in particular scientific disciplines.
7. To facilitate competence strengthening, development and dissemination of training/ methodological material in the area of eco-innovation development and implementation is necessary. To reduce costs, existing materials in the area of sustainable industrial development could be used as a starting point.
8. To promote and to ensure effective technical assistance for SMEs in development and implementation of eco-innovations, establishment of specialised technical support system for SMEs is recommended. Such system could include free of charge advise related to eco-innovation development and implementation to SMEs. Organisation in charge of the specialised technical support to SMEs could also serve as an informational centre to promote technical assistance services provided by other research and consulting organisations.
9. For development of eco-innovations, SMEs need external technical and financial support. A system for identification, development and implementation of preventive environmental innovations developed by the Institute of Environmental Engineering, Kaunas University of Technology could be used for this purpose.
10. In terms of research and development, there is a need for public funding/ subsidies to ensure interdisciplinary research and increased co-operation between SMEs and research organisations.
11. Information dissemination activities should also be undertaken. This should include dissemination of various materials, articles in newspapers and journals, seminars and activities aimed at general awareness raising in the area of sustainable consumption and production.

References

1. Commission of the European Communities (2000). Report on SMEs and the Environment. Produced by Ecotec Research and Consulting. ec.europa.eu/environment/sme/pdf/smestudy.pdf.
2. OECD, (2000). The OECD Small and Medium Enterprise Outlook 2000, OECD, Paris.
3. OECD (1997). The World in 2020: Towards a New Global Age, OECD, Paris.
4. Danilevicius A. Impact of Lithuanian Innovation Policy on Competitiveness of Enterprises and Sustainable Development. Forum „Sustainability Innovations for Industrial Development and Increase of Competitiveness“, 2009.
5. Ministry of Economy of the Republic of Lithuania (2007). Generation of Production Waste in Small and Medium Sized Enterprises that Do Not Need Integrated Pollution Prevention and Control Permits. Report of applied scientific research, Vilnius.
6. Government of the Republic of Lithuania (2010). Lithuanian Strategy for Innovations 2010-2020.
7. Government of the Republic of Lithuania (2002). Long-term Strategy for Development of Lithuanian Economy to 2015, Vilnius.
8. Government of the Republic of Lithuania (2001). National Strategy for Long-term Development, Vilnius.
9. Government of the Republic of Lithuania (2002). National Strategy for Development of Small and Medium Sized Business, Vilnius.
10. Government of the Republic of Lithuania (2005). The Law of the Republic of Lithuania on Public Procurement No. X-471, December 2005, Vilnius.
11. Ministry of Economy of the Republic of Lithuania (2009). Plan for Stimulation of Economy, Vilnius.
12. Lithuanian Statistics Department (2009). Analysis of Business Environment for Small and Medium Sized Enterprises, Vilnius.
13. Government of the Republic of Lithuania (2008). Law on Development of SME sector, Vilnius.
14. Ministry of Environment of the Republic of Lithuania (2007). National Green Procurement Implementation Programme 2007-2011, Vilnius.
15. Lithuanian Statistics Department - <http://www.stat.gov.lt>.
16. Belmane I., Karaliunaite I., Moora H. Uselyte R., Viss V. Eco-design in the Baltic States Industry. Feasibility Study. Nordic Council of Ministers. Copenhagen. TemaNord: 2003.
17. INVEGA, <http://www.invega.lt/en/>
18. OECD, EAP Task Force (1998). Progress in Achieving Basic Capacity level for Cleaner Production in CEEC/NIS, Paris.
19. OECD (1995), Best Practice Guide for Cleaner Production Programmes in Central and Eastern Europe. Paris.
20. Staniskis J., Arbaciauskas V. (2003). Industrial ecology in university curriculum: new M.Sc. Programme in Environmental management and Cleaner Production, Clean Technologies and Environmental Policy, Springer, Volume 5, Number 2.
21. Staniskis J., Varzinskas V., Arbaciauskas V. (2008). Sustainable consumption and production in Lithuania, Environmental research, engineering and management, Kaunas, Technologija. No. 3(45)

