

Innovation Activities in Lithuanian Companies

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Abstract. In the course of this thesis an attempt was made in order to determine the level of innovation activities in Lithuania and to offer some other ways how to increase the degree of novelties in Lithuanian firms. Theoretical aspects of the installation of innovations are reviewed, numerous authors' opinions are studied. Moreover, strengths, weaknesses, possibilities and threats are revealed, considering competitiveness of the Lithuanian economy and changes promoted by innovation development. Furthermore, the difficulties of innovation measurement system are presented. Also, internal and external factors having an influence on the activity named above are examined. Referred to the conducted analyses: measurement of innovation index, correlation analysis between components of innovation index, questionnaire for defining the level of innovation culture, analysis of statistical data, it is stated that there are some problems in Lithuanian innovation system. The recommendations for problem solving are presented in the article also. Following the main aim of scientific work, a modern and revolutionary service is offered - "Self-service cash register as a free lottery". After the presentation of main parts the conclusions and recommendations are introduced in the article.

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Short title: Innovation Activities.

Introduction

An indispensable ground to start any business is to make profit and growth of revenue over time and innovation is the central subject in economic prosperity. Businesses, whether dealing products or services, are facing transformation like never before. Introduction of new or improved product defines the fate of any company these days. Innovation is the successful introduction of specific novel and useful things. In the organizational context, innovation may be linked to positive changes in efficiency, productivity, quality, competitiveness, market share, and others. All organizations can innovate, including for example hospitals, universities, and local governments.

However, just coming up with something that is 'out-of-the box' does not mean that it will always work, because, the thing that is required more than just the generation of a creative idea is to put that thought into a process of action to make a visible difference to the product or service that is considered to be innovated. Hence innovation typically involves risk. The success or failure story of any business depends largely on how well a system is managed within an organization. Nowadays the economy in Lithuania has been facing its deepest

recession since the independence was regained. When the economy is slowing down, the sales and production in majority of economic sectors decline. During this period of global economic crisis the topic of innovation activities is especially relevant. Innovation provides many ways to increase revenue, to enhance the competitiveness and to attract new clients.

Speaking about the level of innovativeness in Lithuanian companies, only a small amount of firms are interested in the invention novelty. In addition, financing of investment projects is not enough high-qualified and effective. The object of the article is an opportunity of innovation activities development in Lithuanian companies. The aim of the article is to offer some ways how to penetrate novelties into Lithuanian organizations.

1. Innovation Activities in Business

Innovation has long been argued to be the driving force of growth. It is important to note that it can also provide growth almost regardless of condition of the larger economy. Innovation has been a topic for discussion and debate for hundreds of years [1]. Schumpeter was among the first economist (in year 1934) to emphasize the importance of new products as

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stimuli to economic growth. He argued that the competition posed by new products was far more important than marginal changes in the prices of existing products [2].

Each firm's unique organizational architecture represents the way it has constructed itself over the time. This comprises its internal design, including its functions and the relationships it has built up with suppliers, competitors, customers, etc. This framework recognizes that these factors will have a considerable impact on a firm's innovative performance as well as the way it manages its individual functions and its employees or individuals. The mentioned above factors are separately identified within the framework as being influential in the innovation process [1].

Innovation matters - but it does not happen automatically. It is driven by entrepreneurship - a potent mixture of vision, passion, energy, enthusiasm, insight, judgment and plain hard work, which enables good ideas to become a reality. The power behind changing products, processes and services comes from individuals - whether acting alone or embedded within organizations - who make innovation happen. As the famous management writer Peter Drucker (1985) put it: Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced [3].

Porter has defined innovation as an attempt "to create competitive advantage by perceiving or discovering new and better ways of competing in an industry and bringing them to market". More broadly the concept can be defined as the introduction of a new or changed product, process, service or new form of organization into marketplace. In short, innovation is the commercialization of new ideas. In addition it should also be noted that innovation is not just a technological and economic process. It is also a complex in which individuals and groups exchange that knowledge [4].

A lot of studies have confirmed that all businesses want to be more innovative. One survey identified that almost 90 % of businesses believe that innovation is a priority for them. The conclusion is that the importance of innovation is increasing, and increasing significantly. [5].

If a company is going to manage innovation and make it as continuous process that produces a steady stream of innovative new products and services rather than a happenstance, hit-or-miss proposition, company is going to have to measure it [6].

Some researchers state that it is difficult to identify clear directions of innovative activity development, hence, innovation measurement system seems to be poorly developed, what does not allow set targets and monitor deviations, respectively. Other authors indicate particular metrics for measuring innovation activities. One of the examples could be the method of using two types of metrics: innovation performance metrics and innovation program metrics. But the calculation of a new product success rate (dividing the number of new

products exceeding the 3-to-5-year original revenue forecast by the total number of new products commercialized over the same period) remains unclear, because of word "forecast". It is difficult to predict something precisely and the results of measurements could be inherently inexact. Moreover, such intangible metrics as customer satisfaction or brand loyalty hardly allow indicating and managing innovation development efficiently. Innovation measurement has always been a thorny issue for researchers.

To evaluate the strength of the relations between different components of innovation index correlation analysis was made. For the final results it is important to test following hypotheses ($H_1 \div H_5$, all hypotheses are formed using proper scientific literature).

- H_1 The more company receives public funding, the more expenditure on innovation activity it has.
- H_2 The more innovation expenditure is spent, the more process innovation is created.
- H_3 Cooperative arrangements for innovation activities promote more organizations, which introduce innovations.
- H_4 New organizational methods in companies have no influence to turnover of innovative enterprises.
- H_5 New marketing methods are a clever way of increasing turnover of innovative enterprises.

The main variables are determined as follow: enterprises which received public funding; expenditure on innovation activity; innovators by type of process innovation; cooperative arrangements for innovation activities; innovative enterprises; enterprises which introduced new organizational methods; enterprises which introduced new marketing methods; and turnover of innovative enterprises in Lithuania (the case of wholesale and retail trade, 2002-2010). All calculations of correlation analysis are performed by a software tool (Microsoft Excel program). The results of analysis are presented in Table 1 and Figs. 1÷5. All statistical data are received from Lithuanian Department of Statistics.

Fig. 1 shows that $B=f(A)$ data lie on a perfect straight line with a positive slope, positive correlation indicates that both variables increase together (Table 1, AB dependence), correlation coefficient $r_{xy}=0,91$. It is strong positive correlation, it means that enterprises which received public funding have more innovation expenditure (statement of H_1 is correct). It will be important to underline that the financial help of the state to innovative projects will encourage the creation of innovations. The more Lithuania companies will allocate financings for innovations, the more firms will introduce new products or processes.

Fig. 2 shows the scatter plot of the $C=f(B)$ data, indicating the reasonableness of assuming a linear association between the variables. It means that the strength of association between innovation expenditure and innovators by type of process innovation is high ($r_{xy}=0,88$) (Table 1, BC dependence). The more innovation expenditure is spent, the more process innovation is created (a statement of H_2 is true).

Table 1. Correlations between parameters: enterprises which received public funding (A); expenditure on innovation activity (B); innovators by type of process innovation (C); cooperative arrangements for innovation activities (D); innovative enterprises (E); enterprises which introduced new organizational methods(F); turnover of innovative enterprises (G); enterprises which introduced new marketing methods (H); turnover of innovative enterprises (I); 2002-2010 (wholesale and retail trade)

Year	A	B	C	D	E	F	G	H	I
2002	27,6	25,1	10,3	31,5	16,0	21,1	47,6	16,2	47,6
2003	54,9	219,1	48,2	36,7	41,1	22,3	43,5	21,0	43,5
2004	58,5	371,5	54,2	35,5	35,6	19,6	36,3	19,8	36,3
2005	42,3	151,6	36,8	25,8	15,2	18,3	32,4	16,3	32,4
2006	36,1	116,8	11,2	47,3	42,7	16,6	48,5	23,3	48,5
2007	29,6	26,5	8,5	61,2	38,0	17,8	43,4	22,1	43,4
2008	46,6	307,5	40,0	32,8	35,4	23,6	54,1	25,4	54,1
2009	50,7	201,7	20,5	23,1	12,4	21,2	38,0	24,4	50,0
2010	25,6	39,5	11,7	33,7	39,0	23,6	51,1	26,7	51,1

A cooperative arrangement is defined as participating with another organization, institution or individual in activities for the purposes of innovation. Businesses can cooperate with many different kinds of partners for innovation, main of them are higher educational and research institutions.

According to distribution in Fig. 3 (Table 1, DE dependence), correlation coefficient is significantly different from zero ($r_{xy}=0,66$) and indicates that cooperative arrangements for innovation activities promote more organizations, which introduce innovations (hence a statement of H_3 is accepted as consistently valid).

The relationship between enterprises which introduced new organizational methods and turnover of innovative enterprises is not so strong, correlation coefficient $r_{xy}=0,46$ (Table 1, GF dependence). But Fig. 4 shows that between variables exists moderate correlation, it means that new organizational methods have a small but positive influence to turnover of innovative enterprises (a statement of H_4 is wrong).

Fig. 5 indicates the moderate correlation between enterprises which introduced new marketing methods and turnover of innovative enterprises (Table 1, HI dependence).

Positive correlation coefficient $r_{xy}=0,72$ means that enterprises with new marketing methods have more chances to increase their turnover, than organizations without any new processes (a statement of H_5 is correct).

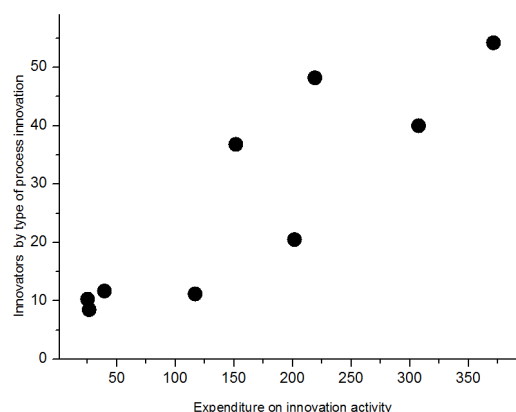


Fig. 2. $C=f(B)$. Dependence of innovators by type of process innovation (C) on expenditure on innovation activity (B); 2002-2010 (wholesale and retail trade).

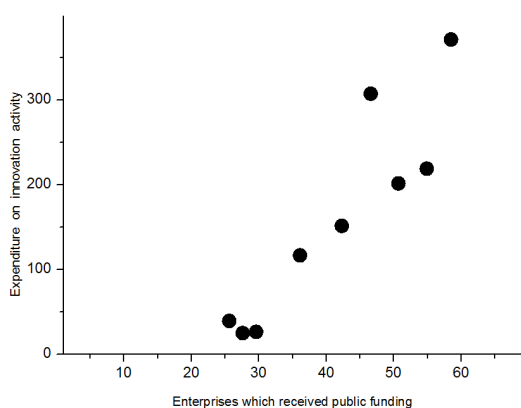


Fig. 1. $B=f(A)$. Dependence of expenditure on innovation activity (B) on enterprises which received public funding (A); 2002-2010 (wholesale and retail trade).

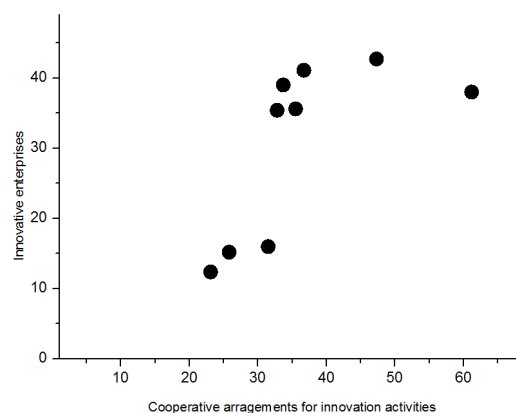


Fig. 3. $E=f(D)$. Dependence of innovative enterprises (E) on cooperative arrangements for innovation activities (D); 2002-2010 (wholesale and retail trade).

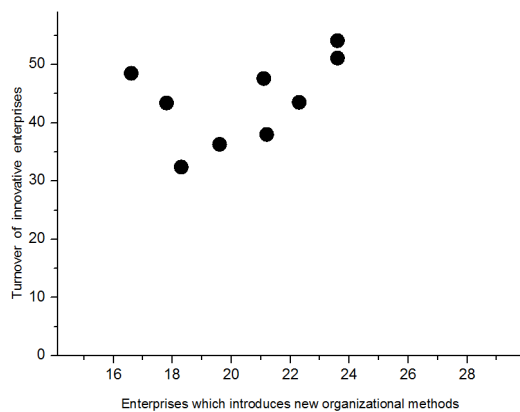


Fig. 4. $G=f(F)$. Dependence of turnover of innovative enterprises (G) on enterprises which introduced new organizational methods (F); 2002-2010 (wholesale and retail trade).

By correlation analysis some important factors were determined that affect the level of innovativeness. For example, governmental intervention through public funding for corporate innovation activities is an important instrument within innovation policy to create and increase the incentives for innovative activities. The second way to accelerate innovation process is cooperative arrangements, for example, cooperation with higher educational institutions. Moreover, organizations with innovation expenditure, enterprises which introduce new organizational and marketing methods have a chance to increase their turnover and to improve their position in the market.

3. Innovation Activities in Lithuania

Speaking about Lithuania, the Lithuanian Innovation policy governance structure is based on the dual ministry model, with the Ministry of Economy responsible for innovation policymaking and implementation, and the Ministry of Education and Science responsible for higher education and R&D policy design and implementation

Differing from the other two Baltic states, Lithuania did not experience a complicated ethnic situation at the time of re-independence in 1991, thus, there were prospects for a smoother transition. Neither was Lithuania industrialized like the two other countries. However, Lithuania did not embark on such a rapid transition like its northern neighbours, which left Lithuania lagging behind in many areas, such as attracting FDI [7].

Compared to the other European Countries, Lithuania remains among the catching up countries with the SII 0.27, although improvement is approached. The general strengths of Lithuanian national innovation system lies in the well developed and continuing its academic tradition higher education sector with strong science and technology research tradition and engineering orientation.

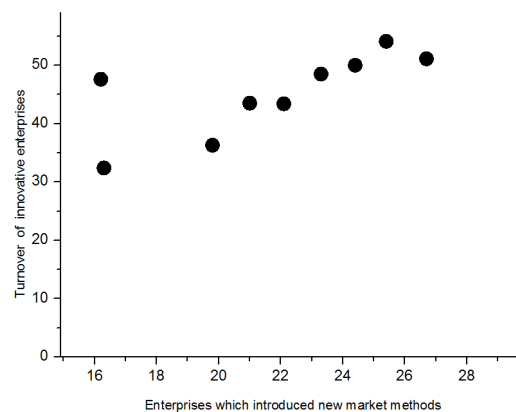


Fig. 5. $I=f(H)$. Dependence of turnover of innovative enterprises (I) on enterprises which introduced new marketing methods (H); 2002-2010 (wholesale and retail trade).

This result makes relatively high share of population with tertiary education (26.8%), high numbers of S&T graduates among them (18.9%), and high enrolment of youth (88.2%). However, low participation in lifelong learning (4.9%) leads to obsolete qualifications, actually not suitable for high skill work. The weak links between business and higher education and R&D communities result not only in obsolete qualifications of the highly educated labor force, but also in low value added innovations, developed without input from the R&D sector [8].

Strengths, weaknesses, possibilities and threats (SWOT) are revealed, considering competitiveness of Lithuanian economy and changes promoted by innovation development.

Strengths.

1. Close economic relations with the other EU countries and countries, belonging to the European Economic Area.
2. Lithuania is the leading country among EU member states according to a number of inhabitants, having higher or post-secondary education. [9].

Weaknesses.

3. Few companies develop innovation; their research and abilities of (technological) development and innovation are not sufficient.
4. Education system (secondary schools and universities) is fragmented and quality of studies does not correspond to economy and society needs of today.
5. Innovation system is fragmented; internal relations among participants of innovation system are poor [9].

Opportunities.

6. Approved joint research programs will enable the coordination of research development and ensure proper use of EU structural funds.
7. Increase of extent of joint project activities implemented by EU companies and education institutions will allow using financial and intellectual EU resources

better and take over experience of innovation dissemination.

8. Demand of products, having higher added value, is growing.
9. EU financial support for business innovation in the year 2007-2013 is provided [10].

Threats.

10. Lithuania does not withstand international competition; therefore, the most talented students, doctoral students and scientists leave Lithuania.
11. Political instability and political decisions made are often inconsistent.
12. Strong and constantly developed R&D and innovation infrastructure, stable policy and financial resources in developed neighbouring states may reduce advantage of innovation system created in Lithuania in competition for business innovation.
13. A lack of strategic (long-term) innovation [10].

4. Analysis of Innovation Activities in Lithuanian organizations

According to Statistics department in 2006÷2008, innovation activities in Lithuania were carried out by 28.8 % of enterprises [11].

In comparison with other countries of the European Union this number is very small. The minimum quantity of information for innovation Lithuanian companies receive from the government, public research institutes and universities or other higher education institutes. Education and business sectors cooperate to a limited extent. This leads to intensive, but not always productive and high value added innovative activities of enterprises. Also the government does not take active part in motivation of firms of creation innovations [12].

In the past five years, important regulative efforts were made in order to improve business conditions and facilitate entrepreneurship. However, the economic crises and tax reform have brought new challenges for businesses and caused reductions in innovation investments, forcing the search for new ways of doing business. These include negative behaviours such as cutting investments, jobs and an increase in 'shadow' operations, but also positive behaviours such as the search for new export markets, value innovations and more efficient ways of operations in domestic and international markets [7].

Many external and internal factors can affect product innovations, business process innovations or their combination [13].

Analysis of external and internal factors affecting innovation process development indicates some circumstances that most of all disturb to novelty's creation. As an example could be the impact of global financial crisis on national innovation performance or policies/ new laws which encourage or limit the implementation of innovations. At the same time,

research findings show that the most dramatic effect on business have technological factors.

To analyze the innovation culture on the organizational level and to define the other problems connected with low level of innovation activities in Lithuanian companies a questionnaire has been made with participation of some workers and managers of different organizations. According to statistical data of 1 January 2012, the number of operating in Lithuania organizations was 83624, about 28.8 % of them are innovative. It is important to calculate the number of innovative enterprises in Lithuania for determining the number of respondents $83624 \cdot 0,288 \approx 24083$.

The questionnaire was sent by e-mail to 43 different organizations to analyze the level of innovation culture in Lithuanian companies. The answers were received only from 40 firms.

25 % of respondents are from service industry, 45 % of participants of questionnaire are from finance, transportation and other organizations. Another 10 % of respondents have been working in manufacturing industry; also few participants are members of information technology, communication, hospitality and nonprofit organizations.

The size of the company plays a big role in the effectiveness of innovation's creation. A large part of respondents (75 %) have been working in small and medium companies (less than 150 employees). And only 25 % have been working in big organizations (more than 151 workers). 45 % of estimated innovative level in the organization is considered to be as sufficient, 20 % - bad and only 15 % - perfect and high; 20 % of respondents could not define it at all. It means that innovative level of organizations in Lithuania is too low. Also to questions "Does the company create an innovative culture" and "Whether workers of Your organization are motivated to create innovations", majority of questioned answered "No". This allows us to draw a conclusion that management of the companies (about 50 %) are not interested in creation of innovations. Organizations have to use a variety of tools to motivate employees to participate in their innovation efforts.

Speaking about circumstances that most of all disturb the creation and implementation of innovations, 50 % of participants of questionnaire blamed lack of funds. It means that organizations in Lithuania have not enough money for financing the innovations. Another 40 % of respondents approve that the lack of ideas disturb the creation and implementation of innovations. On the other hand, employees may generate plenty of ideas, but if management does not appraise them properly, they lose potentially valuable opportunities. These ideas should be assessed in a structured way. 50 % questioned answered that the lack of funds is the circumstance that most of all disturb to create new ideas.

Many companies refuse to make innovation as core component of their strategy. The others think that generating ideas is enough, but without the right process and people this

is just paying lip-service to innovation. Even with structured ideas appraisal, it is not all mechanical. Ideas appraisal should also involve people who are creative - someone who thinks "outside the box" may see it from an angle which can deliver value even if it fails the other tests.

Moreover, the results of questionnaire show that lack of information and organizational culture which does not nurture risk are also factors that disturb to creation of innovations.

To a question "What incentive is received by the worker for new idea" 40 % of respondents confirmed that there are no incentives in their company and only 25 % answered "salary increase/premium pay", another 25 % confirmed that they receive other type of incentives. It once again proves the absence of motivation of new ideas in Lithuanian companies (40 %). Nevertheless, comparing with other countries, the result is not so sad, 50 % of companies motivate workers to create innovations.

Speaking about financing of innovations, only 10 % of questioned specified that they can receive some help from the government or from EU. As it was noted above business-people do not have enough means for introduction of innovations and the state in turn does not render them with any help. Here lies the main reason for absence of new ideas and products. 80 % of participants of questionnaire declared that support from the government, public research institutes and universities or other higher education institutes could help their organizations to be more innovative. And the last question "Would you personally like the company each year to implement more and more innovations" only 50 % answered "Yes", another 50 % of respondents probably do not understand the advantages of innovations and accept new product /service implementation neutrally.

The above presented survey which was based on questioning 40 randomly chosen companies lets us formulate the following considerations about innovation management practice in Lithuania. The results of investigation confirm that about 50 % of Lithuanian companies are innovative or make attempts to be more creative. Another 50 % of answers show that management is not interested in creation of innovations, does not use a variety of tools to motivate employees to participate in their innovation efforts. The majority of questioned, agree to the lack of funds and new ideas disturb to creation and implementation of innovations. Moreover, the questionnaire showed that the government also does not play active role in motivating the firms to create something new.

5. Proposals for Development of Innovation Activities in Lithuanian Companies

Making a picture from an available data (correlation analysis and questionnaire), it is obvious that there are some problems in Lithuanian innovation system.

The first problem is, that the minimum quantity of information for innovation in Lithuanian companies is received

from the government, public research institutes and universities or other higher education institutes. In addition, new knowledge is generated and remains largely in the same sector, without the transfer into business. Therefore, education and business sectors cooperate to a limited extent.

Small business sector's low integration level, low application of scientific knowledge are obstacles to recognize and apply scientific knowledge and to use their innovation activities. To solve this problem, education and business sectors should cooperate more actively and much more closely. Moreover, business organizations in cooperation with other social partners should actively participate in advice and guidance systems and assist providers in developing work-integrated learning and new methods.

Another problem is that the government does not play active role in motivating the firms in creating innovations. Firstly, the government should allocate more means to business sectors to finance the innovations. Secondly, the government should hold competitions and carry out the programs to motivate the managers to create and to implement the innovations. Thirdly, the government should organize free of charge seminars and conferences for business beginners who are eager to studying and to learn about advantages of new ideas.

When heads of the organizations are motivated to implement innovations in their firms, and when they have sufficient financial supply, there might evolve one problem - lack of new ideas, effective at work and bringing income in future. The first step to new ideas is to create innovative culture in the organization. It should be explained to the employees about the importance of innovation, they should be trained to think creatively which might evoke interest and desire to create new things. A good idea here is to use economic methods of management. For example, employee appraisals, salary increase, promotion every new effective idea. And finally, any firm which introduces innovations should be ready to be exposed to huge risk. It should be taken into consideration that innovation might fail and, the market can accept or also reject it. At the same time it is necessary to keep in mind that those who do not risk, never become the leaders.

According to correlation analysis it was determined, that: the more company receives public funding, the more expenditure on innovation activity it has; the more innovation expenditure is spent, the more process innovation is created; cooperative arrangements for innovation activities promote more organizations, which introduce innovations; new organizational methods in companies have an influence to turnover of innovative enterprises; new marketing methods are a clever way of increasing turnover in innovative enterprises. Correlation analysis has confirmed that the effectiveness of innovation activities depends on innovation expenditure, public funding and cooperative arrangements. To increase the degree of novelty in Lithuanian companies, according to the correlation analysis and the questionnaire made, it was determined that there should be allocated more finance on de-

velopment and research and on financing the innovations and cooperation with educational institutions.

Following the main aim of the scientific projects, a modern and revolutionary service is offered - "Self-service cash register as a free lottery". This type of novelty could be used in IKI and Maxima retail chains for development in new directions. The main principle of the innovation is an installed system that shows a lottery in the register screen, in case when a customer spends more than 20 lt. The lottery is represented in the form of keys and the buyer has to choose one of them. The main aspect of the idea is following: customers, using self-service cash register, have a chance to win money (the more money they spend the greater share they could win). The novelty may be of mutual benefit: a customer has a chance to win some money, the corporation, in its turn, may notably increase its selling. The trade's spending on the installation consists of two parts: a remuneration of programmer labour and means for active advertising.

Innovation is a positive change to make someone or something better. Innovation leads to increase in productivity and is the source of increasing wealth in an economy.

Conclusion

Critical overview of scientific literature shows that in business and economics innovation is the catalyst to growth. Entrepreneurs have continuously look for better ways to satisfy their consumer base with improved quality, durability, service, and price which come to fruition in innovation with advanced technologies and organizational strategies.

Moreover, article emphasizes the importance of measuring innovations. Survey data provides a number of different opinions about it. Besides, the information revealed from SWOT analysis shows some weaknesses and threats considering competitiveness in Lithuanian economy and changes promoted by innovation development: education system is fragmented and quality of studies does not correspond to economy and society needs of today; business sector invests in R&D too little; low quality of research and technological development; lack of strategic innovation; internal relations among participants of innovation system are poor.

According to the Statistics department in previous two years innovation activities in Lithuania were carried out by 28.8 % of enterprises. In comparison with other countries of the European Union this number is very small. According to te research of statistical data, financing of investment projects lack in high-quality and effectiveness.

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In order to provide with insight view into the innovation culture of different organizations and to define the main innovation activities problems in Lithuanian enterprises, correlation analysis and questionnaire were made. The first problem is that the government does not play active role in motivating the firms to create innovations. In addition, new knowledge is generated and remains largely in the same sector, without transferring it into business. Therefore, education and business sectors cooperate to a limited extent. Small business sector's low integration level, low application of scientific knowledge are obstacles to recognize and apply scientific knowledge and to use innovation activities. Another part of problem is that in Lithuanian organizations employees ate not motivated to create innovations and to be more creative at daily work.

There are some suggestions to solve the innovation activities problem in Lithuania. For instance, education and business sectors should cooperate more actively and much more closely, the government should allocate more means to business sectors to finance the innovations, also it should be carried out competitions and programs in oder to motivate managers to create and implement the innovations. At the same time, managers should create an innovative culture by using economic methods of management.

According to correlation analysis it was determined, that the level of innovativeness mostly depends on innovation expenditure, public funding and cooperative arrangements. To increase the degree of novelty in Lithuanian companies, according to correlation analysis and the questionnaire the focus should be placed on: more expenses on development and research, financing of innovations and cooperation with educational institutions.

Moreover, the article presents novelty named "Self-service cash register as a free lottery", which could be used in such retail chains as Maxima and IKI. The unique innovation will attract clients and will encourage buying goods in larger sums. The novelty may be of mutual benefit: a customer has a chance to win some money, the corporation, in its turn, may notably increase its selling.

Company needs to innovate to harmonize with the advancing technology; evolving society needs advanced products; the products, processes and services of the company need to be one step ahead of competitors. If the company does not innovate, the customers stop buying the products which leads to the decrease in sales, revenues, stock prices, shareholder returns, the employees might start looking for som other jobs and the company put at danger to collapse.

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