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# DETERMINANTS OF INNOVATION CULTURE AND MAJOR IMPACTS ON THE INNOVATION STRATEGY: THE CASE OF THE INFORMATION TECHNOLOGY SECTOR IN LITHUANIA

#### Christian Le Bas

Research Centre on Company and Institution Economics
Institute of Human Sciences
Berthelot av. 14, FR-69363 cedex 07, France
University Lumière-Lyon 2
Pasteur str. 86, FR - 69365 Lyon cedex 07, France
E-mail christian.lebas@univ-lyon2.fr

# Mindaugas Laužikas

Vilnius University, International Business School Saulėtekio 22, LT-10225 Vilnius, Lithuania Phone (+370 5) 2366 195 E-mail mindaugas.lauzikas@gmail.com

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Abstract. The present research reveals a set of patterns of a general innovation culture within the information technology sector of Lithuania and examines the main impacts and value added from the innovation climate on both the performance of the company and implementation of the innovation strategy. Largely relying on results of a survey in combination of the innovation and human resource strategies in Lithuanian information technology companies (2008) and semi-structured interviews of 10 CEOs within Lithuanian information technology companies (2009,) we found out that potential returns, translated to such factors as a value-added net profit from both innovative activities and research and development and productivity, belong not only to the allocation of human and financial resources to in-

novative activities, but also on parameters of the combination between the innovation and human resource strategies inside the company in addition to building a necessary environment to support innovations, adequate recruitment methods, motivation policies as well as key strategic relationships.

**Keywords**: the innovation strategy, the innovation culture, main returns and the value-added.

#### Introduction

The interest in topics, related to main innovation drivers within information technology companies in Lithuania, particularly determinants of a general innovation culture inside of firms, emerged from the main results of the survey on the combination of innovation and human resource strategies in Lithuanian information technology companies (2008), conducted while studying at the University of Lyon 2. The present article is the third in a series relying on this Franco-Lithuanian survey, where results are based on the data enclosing the answers of CEOs of Lithuanian information technology companies and backed by the experience of other countries and sectors. Having 130 information technology enterprises, covered during the period 2004-2008, and 92 valid responses received with a standard confidence of c.a. 95%, we arrived at a solid set of figures related to various determinants of the innovation culture within the information technology company. These implications were supported by semi-structured interviews of 10 CEOs within Lithuanian information technology companies (2009), which confirmed our forecasts on possible development trends within the information technology market of Lithuania in light of both the recession and the first signs of the Lithuanian economy's recovery.

Given a present vacancy for national-level papers related to innovation strategy inside of firms in different economic sectors, particularly a general innovation culture in information technology firms, we rely on the experience derived from other countries or sectors. Similar experiences of such research as "Validating the Organizational Climate Measure: Links to Managerial Practices, Productivity and Innovation," prepared by British universities in cooperation with Canadian and Australian universities (2005), the UK Innovation Survey, posted by Rob Stones<sup>2</sup> (2001), "Engaged Employees Inspire Company's Innovation," posted in Gallup Management Journal<sup>3</sup> (2006), global innova-

Patterson, M. G.; West, M. A.; Shackleton, V. J.; Dawson, J. F.; Lawthom, R.; Maitlis, S.; Robinson, D. L.; Wallace, A. M. Validating the organizational climate measure: links to managerial practices, productivity and innovation. *Journal of Organizational Behavior*. 2005, 26(4): 379–408.

<sup>2</sup> Stones, R. UK Innovation Survey. Department of Trade and Industry [interactive]. [accessed 15-01-2010]. <a href="http://www.berr.gov.uk/files/file9673.pdf">http://www.berr.gov.uk/files/file9673.pdf</a>>.

<sup>3</sup> Gallup Study. Engaged Employees Inspire Company Innovation [interactive]. Gallup Management Journal. 2006 [accessed 04-12-2010]. <a href="http://gmj.gallup.com/content/24880/Gallup-Study-Engaged-Employees-Inspire-Company.aspx">http://gmj.gallup.com/content/24880/Gallup-Study-Engaged-Employees-Inspire-Company.aspx</a>.

tion survey "Are You Building Innovative Workplace" (2001), the BCG Senior Management Survey (2006), the EU Survey on R&D Investment Business Trends (2008), the Accenture Survey (2004) "Innovation: Closing the Implementation Gap", posted by Peter Haapaniemi, the Pinchot & Company Innovation Climate Questionnaire (2004) have led us to a better understanding of the link between the innovation culture and competitiveness.

An assemblage of clear liaisons among knowledge-based factors has highlighted not only the advantages of allocation of human and financial resources to innovation projects, but also of the organizational structure, innovation climate, cooperation with innovation partners, various innovation encouragement schemes and innovative managerial techniques. More than that, it made us believe that it should not be a one-off investment, a temporary dedication of time for employees to explore new innovative ideas, an involvement of necessary human resources in innovation projects or a onetime partnership with other organizations. Companies need to guarantee a sustainable development, or at least continuous development in the long run. Otherwise, all the efforts could be wasted, and positive changes may occur only for a short duration of time.

It reminds a vaccination program against a serious disease, when one injection is insufficient to give prolonged protection or immunity, and three or more shots are required with an additional booster performed later. However, it is still necessary to make a blood test in order to check the immunity to this disease. This clearly illustrates the importance of long-term innovative activities and sustainability. According to such a metaphoric interpretation, another question arises: which vaccination to use, if an unhealthy innovation culture is as a serious disease. This was the main object of the present research.

# 1. Average Net Salaries Versus the Overall Innovation Culture within the Information Technology Firm

Though currently the horizons of the Lithuanian economy are covered by sick clouds of a high unemployment rate, a demanding budget deficit and a dreadful national debt, modest foreign direct investments figures, a still visible trade deficit, as well as the growth of a gross domestic product at a break-even point, the "brain drain" issue appears even more jeopardizing for a young Lithuanian economy. Not surprisingly, information technology companies under investigation cited a lack of personnel among the most

<sup>4</sup> Thunderbolt Thinking, Inc.Innovation Survey: Are You Building Innovative Workplace [interactive]. 2001 [accessed 18-12-2010]. <a href="http://www.thunderboltthinking.com/survey.htm">http://www.thunderboltthinking.com/survey.htm</a>.

<sup>5</sup> Boston Consulting Group. Innovation Senior Management Survey [interactive]. 2007 [accessed 18-01-2010]. <a href="http://www.bcg.ch/fileadmin/media/pdf/innovation\_2007.pdf">http://www.bcg.ch/fileadmin/media/pdf/innovation\_2007.pdf</a>.

<sup>6</sup> European Commission. EU Survey on R&D Investment Business Trends [interactive]. 2008 [accessed 15-04-2010]. <a href="http://iri.jrc.ec.europa.eu/research/docs/survey/2008/JRC51800.pdf">http://iri.jrc.ec.europa.eu/research/docs/survey/2008/JRC51800.pdf</a>>.

Haapaniemi, P. Innovation: Closing the Implementation Gap. *The Accenture Survey* [interactive]. 2004 [accessed 10-01-2010]. <a href="http://www.accenture.com/NR/rdonlyres/8563B697-E84B-4D69-A555-CB-30D58895D2/0/ideas\_inno\_implementation.pdf">http://www.accenture.com/NR/rdonlyres/8563B697-E84B-4D69-A555-CB-30D58895D2/0/ideas\_inno\_implementation.pdf</a>.

<sup>8</sup> Pinchot & Company Innovation Climate Questionnaire [interactive]. 2004 [accessed 18-12-2007]. <a href="http://infopoll.net/live/surveys.dll/r?sid=27054&r=48037">http://infopoll.net/live/surveys.dll/r?sid=27054&r=48037</a>.

constraining factors within the innovation. However, our survey has failed to prove that the average net salary is the most important factor to attract human resources with high qualification levels, as with no matter of wage levels, sample companies were able to attract employees with master and doctorate degrees.

Therefore, other factors, such as a weak expertise in utilizing human resources, poorly developed management techniques and fragile organization structures largely offset the value-added from combination of the innovation and human resource strategies. Notwithstanding a weak relation between the average net salary and both the percentage of employees with high qualification in a total headcount and the size of a company, our survey has confirmed that information technology companies under investigation with a relatively higher average net salary in LTL contributed to a large variety of impacts in innovation, a higher value-added profit generated from research and development in percentage added to the bottom line, as well as a larger percentage of commercialized innovative ideas (see Fig. 1).

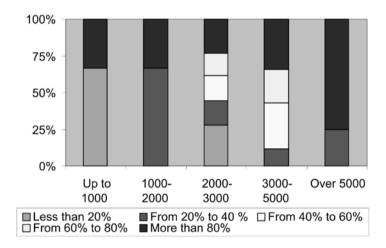


Figure 1. Percentage of commercialized innovative ideas during the period 2004-2008, by the average net salary

Source: prepared by authors

If innovation were only the creation, utilization and selling of new technologies, it would be much easier to build an efficient national system of innovation at the macro level and to implement a highly profiting and value-adding innovation strategy at the micro level. The main challenges appear when inspired innovation processes change the behaviour of enterprises in order to outperform other peers in the market. Information technology companies under investigation were asked whether they have made significant changes to their corporate and marketing strategies, organizational structures or enhanced management tools. Based on the answers of the CEO's, we could identify a clear trend: larger companies experienced more remarkable changes derived from innovations. Overall, enhancement of management tools was most often cited (with 78 answers out of 92 interrogated companies) with a change in the corporate direction the

least cited: 14 answers out of all sample companies (see Fig. 2). Large firms were most likely to adopt new organizational structures, although a high proportion also engaged in a change of the corporate direction, while small and medium firms focused more on improved management tools.

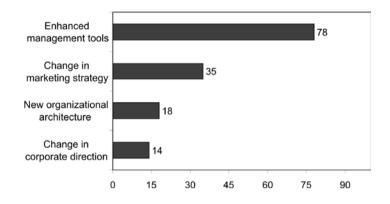


Figure 2. Major changes to the business architecture, triggered by innovations during the period 2004-2008, by the number of answers

Source: prepared by authors

Often the characteristic of "creativeness" is incorrectly used to replace "innovativeness" within the firm; however, as we have already stated, innovations were not only about bringing a new innovative idea on board, initiating the development of new products, processes or services, but also the capability to complete the innovation project or activity via the most efficient use of available financial and human resources. Therefore, net salaries are only of an average significance to enhance the innovation culture in the company. It is obvious that managers should encourage their employees by dedicating a sufficient time to generate new innovation ideas, to outsource some projects to free up internal resources, as well as to improve the cooperation with both public and private partners within the innovation.

# 2. Determinants of the Innovation Culture within the Information Technology Firm

Drawing the architecture supporting the innovation strategy in the information technology firm we can clearly see that factors influencing the innovation performance fall into three different categories: financial resources, innovation culture and human resources. Among financial resources we should not forget the importance of the annual turnover and net profit, average net salaries, investment in research and development as well as innovation-encouragement tools. On the other hand, financial resources are under the threat of being wasted without a number of factors related to human capital: leaders or sponsors of entrepreneurial ideas, employees with high qualification levels

and involvement of human resources in research and development. Moreover, as we can see in the figure below, the innovation fortress won't be completed without taking into consideration determinants of the innovation culture.

Financial resources:	Innovation culture:	Human resources:
Annual revenue in LTL,  Investment in R&D,	Organization architecture and the primary responsible,	Headcount involved in R&D,  Numbers of
The EU financial aid, Funds for performance	Employees' creativity,  Percentage of work time employees can	employees with doctorate and master degrees,
improvement programs and the knowledge-based system,	explore new ideas,  Implementation of innovative ideas.	Percentage of managers as affective sponsors of entrepreneurial
Average net salaries.		initiatives.

Figure 3. Three pillars for the innovation strategy

Source: prepared by authors

Therefore, another group of questions in our survey tended to find answers relating to the main patterns of the overall innovation culture in the company, including such factors as the organization architecture and the primary responsible, management tools in practice, selection and implementation of new ideas, the leader's role, employees' creativity and many others. Interrogated CEOs felt that there was no shortage of new ideas in their organizations, as their employees generated a sufficient number of innovative ideas. However, not all the innovative ideas were translated to a net profit. So did their organization's culture indeed encourage innovations?

First of all we tried to identify who was the primary responsible for encouraging the innovation in companies under investigation. In nearly 74% of all the interrogated enterprises, CEOs were the primarily responsible for fostering the innovation; while 18.48% of firms with an established board logically cited that board as making the most important decisions within the innovation (see Fig. 4). To continue, research and development/innovation departments, cross-functional committees, business units and others were cited in total by less than 8% of companies, which proves that sample firms don't have a well developed organization architecture to boost the innovation culture, mainly due to the fact that they are too small to establish individual units for innovative activities. On the other hand, it is quite a positive finding, as all decisions related to the innovation are made at the highest management level.

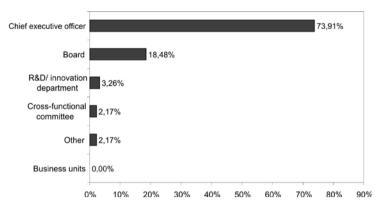


Figure 4. Primarily responsible for developing innovations, by the percentage Source: prepared by authors

Having identified the primary responsible in fostering the innovation, next we tried to find out how many managers as effective sponsors of entrepreneurial initiatives do interrogated companies possess. Formal and informal leaders are crucial in providing the company with new entrepreneurial initiatives, to encourage employees in the generation of new ideas as well as leading them in concrete innovation projects. Effective sponsors may work at different departments being involved in the whole range of activities, and they definitely influence the number of new innovative ideas appearing, the percentage of commercialized ideas as well as the value-added profit to the bottom line. Nearly one third of CEOs stated that their companies have more than half of managers as effective sponsors of entrepreneurial initiatives, while 49% of interrogated companies employ from 30% to 50% of managers as effective sponsors of entrepreneurial initiatives. In addition, only 20% of firms declared possessing up to 30% of managers as effective sponsors of entrepreneurial initiatives (see Fig. 5).

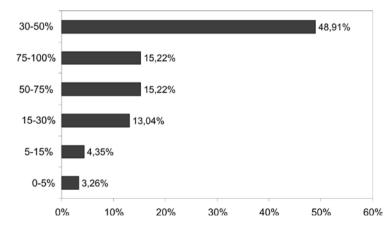


Figure 5. Percentage of managers as effective sponsors of entrepreneurial initiatives, by percentage Source: prepared by authors

According to our survey, the percentage of managers as entrepreneurs was strongly related to the size of a company in terms of the annual turnover: the larger the annual turnover, the higher the percentage of managers generated as entrepreneurs employed by the company. This matter could be explained by larger resources allocated close to innovation projects, higher cooperation level with educational and research and development-related institutions while recruiting people as well as the overall innovation culture in the company. 76.09% of CEOs have positively evaluated the leader's role in assessing the employee's creativity and how this strength can be used, and 75.01% have been quite positive about the leader's role in introducing models, tools and techniques to build thinking skills. To continue, nearly 70% of interrogated CEOs allocated funds and tools for performance improvement programs, as well as funds to create a dynamic, knowledge-based learning system.

As we expected, our survey has shown that Lithuanian IT companies assess innovative ideas on case by case basis, as more than 60% of interrogated companies stated that in general the process to determine which idea to implement varied by innovation type. Nearly 33% of respondents had a formal process to identify the winners or reviewed a formal business case, while ca 14% of sample companies did not implement any formal processes. To continue, we arrived at quite mixed results concerning the primary way to encourage innovation, where nearly one third of respondents had no program in place to encourage innovative activities. Performance assessment programs were the most commonly used tool for encouraging innovation (26.09% out of 92 respondents), and about 22% of sample firms provided rewards based on the value-added of an innovative idea, which was nearly twice higher than innovative ideas with no reward. Given a lack of financial resources within a majority of sample companies, venture capital was still seldom used to fund the best employee ideas, (see Fig. 6).

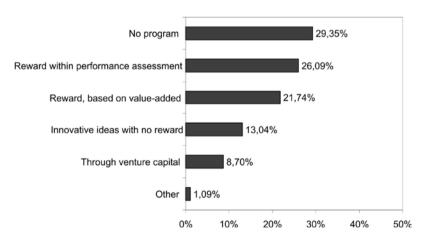


Figure 6. Innovation encouragement practices, by the percentage

Source: prepared by authors

# 3. Percentage of Work Time Employees Can Explore New Ideas

The importance of average net salaries on innovation strategies, as well as determinants of the overall innovation culture, have already been discussed; therefore, we finally arrive at another important factor—percentage of work-time when employees can explore new ideas. This factor is dependent on many conditions and has a significant impact on a companies' innovative performance. However, nearly 60% of sample companies admitted to leaving insufficient time to their employees to explore new ideas, as employees within this group had less than 20% of work time for new ideas. Approximately 26% of CEOs confirmed providing enough time for their employees (20%-40% of work time) to explore new ideas, and only 15% were proud to announce leaving to their employees over 40% of work time to generate new ideas (see Fig. 7).

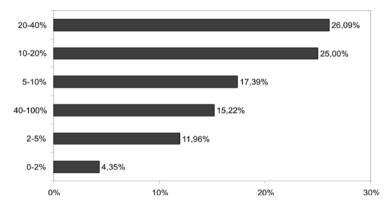


Figure 7. Percentage of work time employees can explore new ideas, by the percentage

Source: prepared by authors

Our survey also proved that free time to generate new ideas was largely related to the company's size, because of financial resources allocated close to innovation projects, organization structures as well as cooperation with educational and research and development institutions. More than one third of companies with the annual turnover from 5 million LTL to 50 million LTL and more than 50 million LTL have provided their employees with more than 40% of work time to explore new ideas, while in more than half of firms with annual revenues up to 5 million LTL employees have less than 20% of time available to generate new ideas (see Fig. 8).

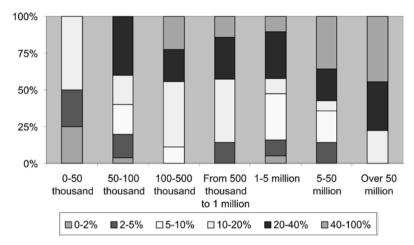


Figure 8. Percentage of work time employees can explore new ideas, by the size of a company

Source: prepared by authors

In addition, another important finding should be presented, mainly related to positive impacts derived from the percentage of time employees can explore new ideas. The more time sample companies provided their employees, the higher the percentage of innovative ideas that were commercialized, as well as a higher value-added profit from research and development that was generated. Going deeper, the availability of time had greater influence on the value-added profit from research and development than on the percentage of commercialized innovative ideas, which could be explained by the fact, that not all the innovative ideas are translated to the value-added profit (see Fig. 9).

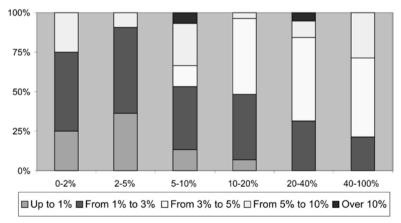


Figure 9. Value-added profit generated from research and development, by the percentage of work time employees can explore new ideas

Source: prepared by authors

In our research we tried to scrutinize the most important drivers for innovations in information technology companies of Lithuania. As you can see in the scheme below, to get the expected returns, which could be translated to such factors as a value-added net profit from innovative activities or research and development or productivity, apart from relying on allocation of human and financial resources to innovative activities, Lithuanian information technology firms need not forget the parameters of combination between the innovation and human resource strategies inside the company.

The combination of different strategies is largely related to building a necessary environment to support innovations, adequate recruitment methods and motivation policies as well as a cooperation consistency of Lithuanian information technology companies with universities, intermediaries, government and other market players. To reach a conclusion, we need to come back to the innovation fortress we have previously built, where a multi-factor approach appears crucial to implementing an efficient innovation strategy. It seems that an improvement of constitutive elements from the three pillars model in a separate, not simultaneous, way could be more discouraging than supporting a company, in addition to creating a too weak network of liaisons and synergies among various factors (see Fig. 10).

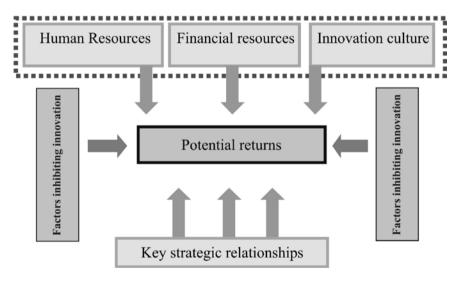


Figure 10. Factors affecting returns from innovation activities

Source: prepared by authors

## Conclusions

A multi-factor approach to innovation strategy is undeniably important for Lithuanian information technology firms. Our survey has failed to prove that the average net salary is the most important factor to attract human resources with high qualification levels. We clearly see that such factors as the primary responsible within the innovati-

on process, percentage of managers as effective sponsors of entrepreneurial initiatives, innovation encouragement schemes and many others are among the most important internal drivers. Moreover, we should not forget many external economic or social factors inhibiting or encouraging the innovation strategy within the firm. A set of factors, such as cultural dimensions, programs that build attitudes towards innovation activities, implemented since early age at school, a fear of risk failure, an openness to the environment and to networking, a technological background, or qualification levels of human resources, is crucial for constructing a powerful innovation fortress.

Companies with a high percentage of formal and informal leaders, responsible for the creation of new entrepreneurial initiatives and leading employees in concrete innovation projects, have a greater chance to commercialize their innovative ideas and to create a higher value, added from investment in research and development. Therefore, companies need to build a comprehensive, multifunctional, encompassing all sub-processes as well as a team-based sponsorship process if they want to institutionalize innovation.

Not taking into consideration the totality of factors could lead to a simulation of an innovation strategy within the company. To avoid such a failure, firms under investigation need to use the experience of the Japanese Kaizen system, the success of which largely depends on a gradual and continuous improvement involving everyone in the organization as well as a performance optimization in all the systems and processes of a company. According to such a model, employees at all levels are encouraged to generate and exercise innovative ideas; however this is impossible without an efficient monitoring system.

The phrase "time is money" is often cited in global markets; thus, the time allocated to employees to explore new innovative ideas could be considered as an investment in both a long and a short run. The managers should understand that saving time and money on processes related to generation of innovative ideas within the company could be more jeopardizing than wealthy. In addition, investment of time in the generation of innovative ideas could be value-adding not only in terms of introducing new products, processes and services, but also by adding more time for production, business as well as managerial activities via performance optimization, various schemes of cost-cutting and better utilization of existing financial and human resources. Therefore, in the long-run, the dedicated time to employees for creativeness will obviously create more time for other activities.

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# INOVACIJŲ STRATEGIJOS ĮGYVENDINIMUI PALANKIOS INOVACINĖS KULTŪROS KŪRIMAS: LIETUVOS INFORMACINIŲ TECHNOLOGIJŲ SEKTORIAUS ATVEJO STUDIJA

#### Christian Le Bas

Liono Lumière 2 universiteto Žmogaus studijų instituto Įmonių ir institucijų ekonomikos tyrimų centras, Prancūzija

### Mindaugas Laužikas

Vilniaus universiteto Tarptautinio verslo mokykla, Lietuva

Santrauka. Inovacijų strategijai įgyvendinti palankios aplinkos ir klimato neužtikrinimas prilygsta žmogaus organizmą alinančios ligos negydymui. Dažnai esami žmogiškieji ir finansiniai ištekliai panaudojami neefektyviai, organizacinė struktūra nepritaikyta inovatyviems projektams vykdyti, darbuotojams skiriama nepakankamai laiko inovatyvioms idėjoms generuoti, organizacija nepasinaudoja verslo procesų nuomos bei mokymosi tinkle galimybėmis, o motyvacinės priemonės daugiau trikdo veiklą nei motyvuoja.

Ieškodamos alternatyvių pajamų bei pelno didinimo šaltinių, ypač ekonomikos sunkmečio laikotarpiu, Lietuvos informacinių technologijų įmonės dažnai susidomi tyrimais ir plėtra bei inovacijomis. Siekiant pertvarkyti kompanijų veiklą, ieškoma efektyvesnio išteklių panaudojimo sprendimų ir neužmirštama, kad, lygiai kaip ir gydant ligą, pirmiausia reikia išnaudoti natūralių priemonių potencialą, o tik paskui imtis radikalesnių sprendimų.

Lygiai kaip ir receptiniai vaistai turi būti vartojami laikantis griežtų taisyklių, inovacijoms palankios aplinkos kūrimo arba tobulinimo priemonių įgyvendinimas turi būti griežtai koordinuojamas ir skatinamas formalių bei neformalių lyderių. Kitaip potencialūs rezultatai gali būti trumpalaikiai arba, stiprinant vieną faktorių, galima neigiamai paveikti kitą. Taip pat nereikėtų užmiršti tvarios plėtros arba ilgalaikiškumo principų – nuolat skatinti inovacinę veiklą organizacijoje ir atlikti efektyvią kontrolę, nes trumpalaikis pastangų bei išteklių sutelkimas novatoriškai veiklai ir ne visa apimanti inovacijų strategija prilygsta nepakankamam vakcinos dozių skaičiui, siekiant sustiprinti imunitetą ir apsisaugoti nuo ligos. Remiantis tokiu scenarijumi, investicijos į inovacinę kultūrą tiesiog reiškia papildomą eikvojimą, o inovacijas ribojantys veiksniai ir neigiami simptomai atsinaujina.

**Reikšminiai žodžiai**: inovacijų strategija, inovacinė kultūra, inovacijų nauda ir pridėtinė vertė.

Christian Le Bas, Liono Lumière 2 universiteto Žmogaus studijų instituto Įmonių ir institucijų ekonomikos tyrimų centro profesorius, ekonomikos mokslų daktaras. Mokslinių tyrimų kryptys: žiniomis paremta ekonomika, intelektinė nuosavybė ir inovacijos.

Christian Le Bas, Research Centre on Company and Institution Economics, Institute of Human Sciences, University Lumière-Lyon 2, France, professor, doctor of Economics. Research interests: knowledge-based economy, intellectual property and innovations.

**Mindaugas Laužikas**, Vilniaus universiteto Tarptautinio verslo mokyklos lektorius, ekonomikos mokslų daktaras. Mokslinių tyrimų kryptys: nacionalinės inovacijų sistemos, tarptautinis verslas, žinių sklaida, inovacijų ir žmonių išteklių strategijų derinimas.

**Mindaugas Laužikas**, Vilnius University, International Business School, lecturer, doctor of Economics. Research interests: national systems of innovation, international business, knowledge diffusion, combination of the innovation and human resource strategies.