GROWTH OF FOOD SECTOR’S PRODUCTIVITY THROUGH INNOVATIONS

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Productivity is the ultimate driver of long-run economic growth but productivity of European countries, particularly Latvia, is lagging behind the United States (US) and some other developed countries. The purpose of this paper is: to find out and to recommend innovations’ types, which are more suitable for increasing the competitiveness (i.e., productivity) of manufacturing enterprises, in particular, of Latvia’s food sector’s enterprises; where the tasks are: 1) to clarify the current situation regarding to the competiveness, particularly productivity, and innovations in the Latvia’s food sector, comparing with other Baltic States; and 2) to find out financially the least consuming innovative tools for increasing the competitiveness and productivity of food sector’s enterprises. The comparison of productivity between the Baltic countries and other European Union (EU) countries (EU – average) highlights that it is lower in Latvia. At the same time, the share of personnel costs in the production value is considerably higher. Moreover, the value added per employer is also smaller. The share of innovative food enterprises in Latvia is the lowest among Baltic countries, and also in EU. Comparing the types of innovation, the organisational innovations are less common in EU, Baltic countries and, especially, in Latvia, than in US. The results strongly highlight the importance of organisational, notably management, innovations as a tool (requiring smaller investments) for increasing the productivity of food enterprises. The implementation of organisational and process innovations, inter alia, management practices and tools, deliver improvements in effectiveness, particularly productivity, and will offer more potential for competitive advantage than others.

Key words: competition, innovation, food enterprises, productivity.
JEL codes: L66, M11, O31, Q18.

1. Introduction

Nowadays, the food sector faces several new challenges: food security, sustainability, energy efficiency, climate change GHG emissions), price volatility, and demographic change (High Level Forum…, 2014; FAO, 2015). Moreover, the connection between food security and food system sustainability, including the reduction of food losses and waste, has been recently emphasised in many strategic documents at the global and European level (Capone, 2014; FAO, 2015).
The Transatlantic Trade and Investment Partnership between the United States (US) and the European Union (EU) promises significant potential for SMEs, particularly food enterprises (European Commission, 2015b). These new challenges require additional measures, including any type of innovations and investments, for increasing the competitiveness of food sector at all and individual enterprises in particular. L. Latruffe (2010) considers that competitiveness is a relative measure; and it is, however, a broad concept and there is no agreement on how to define it, or how to measure it precisely. Therefore, emphasis is given to productivity (and its growth), which is generally agreed to be a key of competitiveness and a part of competitiveness (Latruffe, 2010; OECD, 2011; European Commission, 2013).

Productivity is found to be the ultimate driver of long-run economic growth (Bloom, 2015) but European productivity lags behind the US and some other developed countries (OECD, 2010; Hollander, 2015). Before the financial and economic crisis, it was thought that productivity in the EU would eventually catch up the US but the EU not only continues to lag behind the US, but the productivity gap has recently widened (Aznar, 2014).

Innovations are considered a key factor for the economic growth, as they contribute to higher productivity (Karantininis, 2010; Mohnen, Hall, 2013; Pereira, 2013). Sustained enterprises’ performance is dependent on the continuous improvement of products due to the increased competition, fast development of technologies and continuously changing customer demands (Tepic, 2014). Nowadays, it is insufficient to see innovations as new product development and process innovation or traditional R&D but non-technological activities play a crucial role (Pereira, 2013). Furthermore, the impact of new or improved goods is often restricted to a small number of sectors, whereas non-technological, i.e., organization innovations, can be applied to many different economic activities of all sectors (Comin, 2009). Therefore, organizational innovations, particularly modern management and production methods, tools and practices, are widely implemented in the US (Chen, 2009; Hassan, 2013). B. Van Ark et al. (2008) argue that EU lags compared to the US due to slow emergence knowledge economy, including knowledge about and implementation of various modern management practices, tools and techniques (Bloom, 2015). Unfortunately, in Latvia until now research, regarding above mentioned issues, are not realized; and such kind articles have not been published.

Therefore, the purpose of this paper is to find out and to recommend innovations’ types, which are more suitable for increasing the competitiveness (i.e., productivity) of manufacturing enterprises, in particular, of Latvia’s food sector’s enterprises. The following tasks are indicated: 1) to clarify the current situation regarding to the competitiveness, particularly productivity, and innovations in the Latvia’s food sector, comparing to other Baltic States and EU (average); and 2) to find out financially the least consuming innovative tools for increasing the competitiveness and productivity of food sector’s enterprises.

The evaluation of current situation regarding to the issues of productivity, and innovations in the Latvia’s food sector, comparing to other Baltic States and EU, has done by using the reports of institutions, including international, EU and governmental; and data from the Central Statistical Bureau (CSB) database; data of Eurostat da-
tabase and data from Eurostat (2015) databases of Results of the Community Innovation Survey 2010, 2011, 2012; and as well as data of European Commission (2015a) Business Survey database, regarding planned investments. Investment survey of the manufacturing sector, which gathers information on enterprises’ investment plans, is conducted twice a year. Comparable data for all Baltic States are available from 2005. The methods mainly were following: data grouping and calculation, simple linear regression for estimating the time trend for the historical data etc. For finding innovative tools for increasing the competitiveness and productivity of food sector’s enterprises, in particular organisational innovations, materials used for the studies are as follows: different publications and papers, mainly most recent, e.g. scholars’ articles, research papers of international institutions (e.g., OECD), where the appropriate qualitative methods (e.g., monographic, analysis, and synthesis) of research were used.

2. Productivity and innovations

Productivity is observed as a significant success factor (Khokhar, 2014), which is commonly defined as a ratio of a volume measure of output to a volume measure of input use (OECD, 2001). Among other productivity measures, the labour productivity is particularly important in the economic and statistical analysis (Freeman, 2008); and value added per employer is among the most widely used measures of productivity (OECD, 2001). Despite the labour productivity in the EU food industry increased, the EU continues to lag behind international competitors like the U. S. (FoodDrinkEurope, 2015).

The labour productivity is the main factor that explains the dynamics of competitiveness in Eastern European countries (Beņkovskis, 2014). According to the CSB data from 2002 to 2007 Latvia’s labour productivity was increased by an average of 6.4% annually. It is quite respectable performance by any standards. Even more impressive is the fact that productivity continued to climb during the financial crisis (2008–2010) – an average of 5.9% per annum. But since 2010, a “miracle” came to an end and for the next three years, labour productivity grew by only 1% a year, i. e., the productivity slowed down almost 6 times (Beņkovskis, 2014).

The analysis carried out by the authors show that average value added per employer in Baltic countries is 2.7 times lower than in EU but the value added per employer in Latvia’s food sector, particularly food processing and beverages enterprises (hereinafter – food enterprises), is the lowest among the Baltic countries (Fig. 1). The value added created by Lithuania’s food enterprises is slightly higher than in Latvia, but leader among the Baltic countries is Estonia.
Latvian food sector is also characterized by comparatively high labour intensity. The labour input in proportion to production value is higher or not lower than in other Baltic countries, and the average indicator for food enterprises in Latvia is close to the average EU level (Fig. 2).

However, the share of personnel costs in production value in Latvia is notably above the levels in other Baltic countries and the EU average. Therefore, considering the already existing high labour input in proportion to the production value and the low labour costs in Latvian food sector, the rise of wages and salaries even at the Estonian level could endanger the competitiveness of Latvian food products in the existing traditional consumer product markets at the existing technologies, and the convergence of the wages and salaries to the EU average level is a serious challenge for food sectors of all Baltic countries. This implies a pressing need to facilitate the growth of labour productivity in Latvian food sector. Some reasons, which lead to lower productivity of EU food industry, are recognised: 1) reduced investment in ma-
chinery and technologies, as well as reduced investment in the recruitment of skilled workers; and, 2) large number of enterprises operating with small scale operations (FoodDrinkEurope, 2015). These shortcomings could be important also in Latvia.

Besides the typically measured factors of productivity, several significant factors of productivity, which are not measured or are mis-measured, are important (OECD, 2001; Syverson, 2011). These are, for example, capacity utilisation; managerial practice/talent; higher-quality general labour and capital inputs; information technology, and research and development (R&D); learning-by-doing (identifying the opportunities for process improvements); innovations in product quality; organisational structure; and measurement of errors. Moreover, the information, which records currently unmeasured aspects of production practices could be a priority, for example, data on managers and management practices, producer-level prices, input quality measures, intangible capital proxies, innovation spending (Syverson, 2011).

The latest (third) edition of the Oslo Manual (OECD/Eurostat, 2005: 46) defines innovation as “…the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.” H. Armbruster et al. (2008: 644) consider that innovation is “…a complex phenomenon including technical (e.g., new products, new production methods) and non-technical aspects (e.g., new markets, new forms of organization) as well as product innovations (e.g., new products or services) and process innovations (e.g., new production methods or new forms of organization).” Based on these considerations, four different types of innovations were distinguished: 1) technical product innovations; 2) non-technical service innovations; 3) technical process innovations; and 4) non-technical process innovations, which could be organisational innovations (Armbruster, 2008).

Scholars recognised that food industry is one of the sectors that are typical low-technology or low-tech and it is relatively dominated by low-tech enterprises with less product innovation. Besides, it is characterised by incremental innovations, mainly oriented towards higher quality, and based on customers wishes (Vyas, 2015). Therefore, the significance of organisational innovations in food industry is very high.

The data on innovation activities of food enterprises (Fig. 3) show that at present Latvia’s food enterprises are the least innovative among the Baltic countries. The share of innovative enterprises in Latvia is also low in comparison with the EU average indicator. The most popular innovations of Latvia’s food enterprises are marketing innovations and process innovations, though the share of marketing and process innovative enterprises in Latvia is comparatively low (Fig. 3).
Latvian food processing enterprises lag considerably behind other Baltic countries in product innovation activities. The share of marketing innovative enterprises in Latvian food sector is especially low, if compared with Lithuania, where marketing innovation activities is the most popular innovation direction employed by almost half of the surveyed food enterprises. In Estonian food sector, the most popular innovation direction is process innovation, though marketing and product innovations are almost as equally popular. Similar to the EU, the least attention in all Baltic countries is paid to organisational innovations, where the share of organisation innovative enterprises is the smallest among the main innovation types. This is the only type of innovations, where the share of innovative enterprises in Latvia is close to the neighbouring countries.

3. Innovations for productivity raising

Innovations can be made in processes that reduce costs, increase productivity, and expand markets or services (Stevenson, 2012); and is the complex phenomenon, including technical and non-technical aspects (Pereira, 2013). Non-technological innovations are an important element of enterprises’ innovation activities that both supplement and complement technological innovation, because nowadays, it seems insufficient to see innovation only through the development of new product and process innovation or traditional R&D (Pereira, 2013). Besides, the management scores by country are strongly correlated with GDP per capita; and the US has the highest management practice scores (Bloom, 2012).

Some scholars (e.g., Roth, 2015) distinguish the terms of non-technological innovations such as: organisational and managerial. F. Damanpour and D. Aravind (2012: 431) propose the term management innovations; and define the ‘managerial innovation’ as “…new approaches in knowledge for performing the work of management and new processes that produce changes in the organization’s strategy, structure, administrative procedures, and systems.” Moreover, the managerial innova-
tions have variable called administrative, organizational, or management innovations (Pitsis, 2012). J. Hervas-Oliver and M. Peris-Ortiz (2014) consider that organisational innovation includes new administrative organisational and managerial activities; and distinguish two inter-related different kinds of organisational innovation: structural innovations and managerial innovations. The authors of this paper agree with scholars who use the term of organisational innovations for all of it, because the methodology used in the EU-wide innovation survey includes term organisational innovations (Eurostat, 2015; Hollanders, 2015).

Regarding distinguishing between process and organisational innovations, it is considered that many innovations contain aspects of both types of innovation (OECD/Eurostat, 2005). The introduction of new processes may also involve the first use of new organisational methods such as team works, implementation of management tools, etc.

S. Razavi and O. Attarnezhad (2013) define organisational innovations as the organizational capability to renovate ideas and knowledge into new products, services or processes continuously for the benefit its stakeholders, where one of the key factors in the management and development of organizational innovation, as found by many studies, is the transformational leadership.

Latvia’s food enterprises focus more on investment as replacement of old equipment and less on rationalization investment and investment for other purposes, including in human capital (European Commission, 2015a). The trends of planned rationalisation (i.e., organisational) investments in the period from 2005 until 2015 in Baltic States and the EU average (Table 1) show that in all countries the proportion of investments has decreased. Although, the trends are not statistically significant, the tendencies of development are clearly observed. Moreover, the proportion of Latvian enterprises, which planned investing in rationalisation (i.e., organisational) innovations, is significantly lower than in other Baltic countries, for example, more than 3 times lower, compared to proportion of Estonian enterprises (Table 1).

Table 1. Trends of planned proportion of rationalisation investments of food enterprises from 2005 until 2015 in the Baltic States and the EU (average) in 2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Regression equation</th>
<th>Coefficient of determination</th>
<th>Planned in 2015, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estonia</td>
<td>$y = -0.1327x + 53.02$</td>
<td>$R^2 = 0.002$</td>
<td>61</td>
</tr>
<tr>
<td>Latvia</td>
<td>$y = -0.0764x + 21.449$</td>
<td>$R^2 = 0.0038$</td>
<td>18</td>
</tr>
<tr>
<td>Lithuania</td>
<td>$y = -0.6109x + 33.056$</td>
<td>$R^2 = 0.1854$</td>
<td>32</td>
</tr>
<tr>
<td>EU (average)</td>
<td>$y = -0.2345x + 22.78$</td>
<td>$R^2 = 0.0786$</td>
<td>19</td>
</tr>
</tbody>
</table>

Source: authors’ calculations based on European Commission (2015a).

The appropriate techniques, tools and practices of innovativeness could be found to raise organisational efficiency and performance (Roth, 2015). The fast changing economic conditions such as the severe global competition, declining profit margin, customer demand for high quality product, product variety and the need to reduce lead–time have major impact on manufacturing industries. To respond to these needs various industrial engineering and quality management strategies such as ISO: 9000, Total Quality Management (TQM), Kaizen engineering, Just–in–time
manufacturing (Hassan, 2013). The enterprises managers must identify the determinants of productivity and find any tools for its improving (Khokar, Dhankhar, 2014). These tools or techniques are various, for example, TQM; ISO: 9000, Lean manufacturing or Lean production or Lean thinking (hereinafter – Lean), and above mentioned Just-in-time, Kaizen etc. (Pettersen, 2009; Khokar, 2014; Sanidas, 2014).

The benefits of waste elimination after the implementation of Lean are following: 1) in physical environment (manufacturing or logistics flow) the ratio between the various activities is commonly – 5% value added; 60% non-value added; and 35% necessary, but non-value-added; 2) in an information flow environment (e. g., office, distribution or retail) the ratio is commonly – 1% value added; 49% non-value added; and 50% necessary, but non-value added (Hines, 2008).

Management innovations strongly affect enterprises’ innovative culture and higher administrative innovation levels, and encourage the technical innovation. Besides, TQM is an appropriate resource to foster innovativeness and organisational innovation. Moreover, quality management has the potential to increase quality of product produced, productivity and organisational effectiveness as well as organisational performance and competitiveness (Bloom, 2015).

Main measures or tools for Lean implementation are following: just in time practices; resource reduction; human relations management (e. g., team organization, employee involvement); improvement strategies (e. g., continuous improvement-kaizen); supply chain management; scientific management etc. (Pettersen, 2009). B. Nicolleti (2015) proposes the term of Lean innovation, which represents the systematic interpretation of Lean thinking principles relative to innovation in its different forms, for example, in innovation management.

However, some scholars, e. g., D. Mehri (2006) and R. Conti et al. (2006), point out some negative aspects of Lean, such as workers’ safety and workers’ stress. While Lean focuses on reducing costs, innovations create new value that satisfies customers’ certain needs, and thus enlarges the market size and strengthen an enterprise’s competitiveness. An organization that effectively accommodates both Lean and innovation will benefit the most and be competitive in the long term (Chen, 2009).

Recent documents emphasise the application of lean manufacturing practices to food processing industries in order to improve operational efficiency and productivity (Matt, 2013; Dora, 2014). Despite the practice showing that it is mostly medium and large companies which have introduced productivity improvement programs, implementation of Lean production is easier in small enterprises than in large ones (Matt, 2013). Benefits of implementation innovative quality management systems in European food micro- and SMEs are the following: cost reduction; profitability increase; productivity increase; customer complaints reduction; cycle time reduction; improved sales; delivery time reduction; scrap rate reduction; and employee complaints reduction (Dora, 2013a). However, there is a lack of knowledge of quality management methods and Lean practices; and lack of resources among the majority of EU food micro- and SMEs (Dora, 2013a; 2014).

S. Kostic-Nikoli and I. Nikolic (2013) argue that the efficiency in the food enterprises was improved from 5% to 17% due to the implementation of Lean practices.
Moreover, Lean Six Sigma tools’ implementation minimises food safety risk, improves productivity and quality of products, and reduces unnecessary waste and time (Kostic-Nikoli, 2013). M. Dora et al. (2013b) argue that the application of Lean in the food sector is developing but it is still at an early stage of development. Moreover, the food SMEs is focused more on the food safety and food quality management methods but less on the process improvement methods. The Lean implementation in food SMEs improves the performance, especially, productivity and quality, where the skills of employment and organisational culture are the most critical success factors (Dora, 2013b).

4. Conclusions

1. At present, the findings show that the productivity and innovations indices of enterprises in Latvia’s food sector are the lowest among the Baltic countries and the EU average level. Besides, the Latvian food sector is also characterized by comparatively high labour intensity along with personnel costs that are still low in the Baltics and especially the EU. Potential rise of wages and salaries (as stimulated by demands of social partners – trade unions) is a serious challenge for the food sectors of all Baltic countries, which are in need of rapid growth of labour productivity, especially in Latvia’s food enterprises.

2. Currently, Latvia’s food enterprises, similar to food enterprises in other Baltic States and the EU countries, focus more on investment in replacement of old equipment and less on rationalization investment and investment for other purposes, including in human capital. However, the trends of proportion of planned rationalisation (i.e., organisational) investments of food enterprises in the period from 2005 until 2015 in all Baltic States and the EU have decreased, and the Latvia’s trend is more significant. It goes to show that the importance of these innovations is underestimated in Europe.

3. The implementation of non-technological or organisational innovations may deliver improvements in effectiveness, particularly productivity, and will offer more potential for competitive advantage over others. Based on literature review, it could be concluded that the implementation of organisational innovations, inter alia, new organisational, management and process methods, tools, techniques and practices, such as TQM, Lean, Lean Six Sigma, may be an perspective and effective tool, because it requires smaller investments or less financial resources.

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References


Summary

Productivity — the basis of long-term economic growth, but in European countries, particularly in Latvia, productivity lags behind that of the United States and other advanced countries. The goal of the article is to identify and present the types of innovations that are more suitable for increasing competitiveness in the Latvian food industry. A comparison of productivity in the Baltic and other European countries, using secondary data analysis and linear regression, revealed that productivity is the lowest in Latvia. In Latvia, personal costs in production are the highest, while the additional value created by the employee is the lowest. The study results revealed the importance of organizational (management) innovations in increasing food producers' productivity. The introduction of organizational and process innovations, management practices and tools will increase efficiency, particularly productivity, giving a competitive advantage.

Raktiniai žodžiai: konkurencija, inovacija, maisto organizacijos, produktyvumas.
JEL kodai: L66, M11, O31, Q18.