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FOREWORD

In 2016 editorial board received papers from 8 countries. Range of topics are enough wide, but they are joint in how to make necessary decisions in conditions in growing of instability.

For searching right solutions necessary to understand sources of instability and constantly follow the changes in the external environment of business. Some of the papers are devoted for searching best solutions in different industries (some of them in case of Latvia), some papers are devoted to new possibilities which come with using IT systems.

All the papers were double blind peer reviewed. Following the necessary corrections and additions resulting from the review process the 11 accepted papers were included into the issue.

Head of the Editorial Board,  
Professor Dr. Vulfs Kozlinskis
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GROWING INSTABILITY OF THE SOCIO-ECONOMIC SYSTEM

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Abstract
The world is facing a growing instability of its socio-economic system. The socio-economic system is comprised of a number of subsystems that are not progressing at equal paces. This creates instability in the entire system.
Shifting centres of gravity in the global economy, demographic shifts, the financial (including debt) crisis, etc. are only the visible consequences of system development.
Shifting centres of economic (and military) power constitute a permanent factor which works relatively slowly, but in the second decade of the 21st century (and onwards) we must deal with a transforming system with not only quantitative but also various qualitative parameters.
Differences in population growth (among countries and continents) and the “Youth Bubble” contribute to rapidly growing immigration, which is becoming an important instability factor (in countries receiving immigrants, it is connected with tremendous differences in the value system).
Political subsystem weaknesses add to this problem, as politicians who do not pursue the right long-term goals create a situation that eventually results in a crisis.
Nowadays we must deal with a crisis in the whole system and try to rebuild the system.
The paper is conceptual and its aim is to initiate discussion.

Keywords: socio-economic system crisis, instability factors, political subsystem, value system

INTRODUCTION
The aim of this research is to analyse the growing instability of the socio-economic system. The specific research tasks are as follows: 1) to identify key factors contributing to the instability of a socio-economic system; 2) to analyse the latest global trends regarding the instability of the socio-economic system; 3) to identify primary sources of instability and to make some predictions.
According to Norbert Wiener [39], there are very few homeostatic processes in a socio-economic system and the socio-economic system’s function is based on principles of game theory; every player, possessing certain information, is usually led by the principles of rationality.
Additionally, we must take into account that information volume and asymmetry [1] in the system is growing, and this leads to more mistakes in decision-making and reduces the system’s stability. In these conditions, the importance of regulation (long-term government policy), according to Edward Prescott and Finn Kydland (Nobel Prize winners in 2004), is growing.
There is a lack of research studies on this problem with the systems approach, in which scientists try to revise old statements.
Strong evidence of this is the unclear aim(s) of socio-economic system development (stressed by Norbert Wiener in 1961) [39].
The paper employs systems theory and the systems approach in analysing the world’s current socio-economic system as well as such research methods as analysis and synthesis, statistical analysis, the monographic method and logical construction.
The socio-economic system, on the one hand, is manageable, while on the other hand it involves self-adjustment elements. Socio-economic systems are complicated systems, as there are a lot of strong and diverse informative, material, etc. interconnections between their subsystems and elements. The subsystems do not all develop at the same pace, which, in turn, leads to instability.
Notes: the shading shows the intensity of change (the darkest shade represents the fastest change); PESTEL (political, economic, social, technological, environmental and legal) analysis

Figure 1. Socio-economic system

The technological, economic\(^2\) and partly social subsystems are developing at higher speeds (especially the technological subsystem). It is possible to try to measure the stability of subsystems. For instance, stability in an economic subsystem from the aspect of economics may be characterised by the following indicators\(^3\):

- share: debt/GDP – less than 90%;
- state budget deficit – 2-4% of GDP (the government budget may not grow at a faster pace than GDP);
- inflation: 3-5% ;
- monetary reserves: ~ 8% of GDP;
- debt management: no more than 20% of annual exports;
- military expenses no higher than 4.5% of the budget;
- state investments: above 10% of GDP;
- imports may not exceed 40% of GDP;
- unemployment may not exceed 15-20% of the labour pool.

We understand these indicators as warning signals which show the results of the influence of a number of factors, including factors from other subsystems (political, legal, technological, etc.). Countries exceed the critical levels, and the abovementioned indicators, in turn, are to a varying degree a result of policies (economic, demographic, etc.). It will be useful to elaborate stability indicators for other subsystems.

We must take into account that there exist some factors that in the long term deeply influence the whole socio-economic system; nowadays, the main one is demography\([18],[21]\), etc.

Differences in the birth rate and the growing (or decreasing) population and changes in the demographic structure lead to changes in the population, growing immigration, etc.

The key factors contributing to the instability of a socio-economic system, in the author’s opinion (and according to a number of research papers in the first fifteen years of the 21\(^{st}\) century), are shifting centres of gravity of the global economy, the financial (including debt) crisis and demographic shifts.

The number of references\(^4\) to these three factors shows the increasing trend of focusing on them. We must take into account that nowadays (as one of the results of globalisation) all these factors work globally at different speeds.

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\(^1\) The figure is based on M. Porter’s concept of dividing a system into subsystems and is connected with the aim of the research, too. For instance, M. A. El-Erian\([10]\) separated the economic and financial subsystems.

\(^2\) The development of a pre-emptive economic system was stressed by Z. Bauman (in interviews (2010-2011) and personal conversations (2011)). Historically, one of the first scientists who discussed (using different terminology – productive forces and productive powers) the idea of the different speed of development of economic subsystem parts was Karl Marx\([22]\).

\(^3\) The indicators are collected as averages from different sources (for instance,\([29]\)) and we must look to them only as a source of warning (not as strict rules), because the results of exceeding these indicators differ across different countries.

\(^4\) The importance of the abovementioned factors was verified by employing the Google search engine and library databases (academic journals, books and e-books) to identify the number of references to the factors – their keywords: “debt crisis”, “financial crisis”. 
Research limitations
The research is mainly based on literature studies and secondary data. Instability factors were used as cases without going into details. The main period of analysis is 2000-2015 (1970-2015 for long-term factors). The main aim of the research is the recognition of new directions for further research studies.

Research results and discussion
1. SHIFTING CENTRES OF GRAVITY OF THE GLOBAL ECONOMY
The table below shows data for some economic centres of gravity – GDP per capita\(^6\) and economic growth rates.

| GDP per capita (in thousands of USD) for the G-7, the BRICS and regional powers |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                               | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| USA                           | 44.7 | 46.4 | 47.0 | 45.7 | 47.2 | 49.9 | 51.7 | 53.0 | 54.6 |
| Japan                         | 34.1 | 34.3 | 38.2 | 39.5 | 43.1 | 46.1 | 46.7 | 38.6 | 36.2 |
| Germany                       | 36.4 | 41.8 | 45.7 | 41.7 | 41.8 | 45.9 | 44.0 | 45.6 | 47.8 |
| UK                            | 42.5 | 48.4 | 45.2 | 37.2 | 38.3 | 41.0 | 41.3 | 42.3 | 46.3 |
| France                        | 36.5 | 41.6 | 45.4 | 41.6 | 40.7 | 43.8 | 40.9 | 42.6 | 42.7 |
| Italy                         | 33.4 | 37.7 | 40.7 | 37.0 | 35.9 | 38.4 | 34.8 | 35.4 | 35.2 |
| Canada                        | 40.2 | 44.3 | 46.4 | 40.8 | 47.5 | 52.1 | 52.7 | 52.3 | 50.2 |
| Brazil                        | 5.8  | 7.2  | 8.6  | 8.3  | 10.7 | 12.6 | 11.3 | 11.7 | 11.4 |
| Russian Federation            | 6.9  | 9.1  | 11.7 | 8.6  | 10.4 | 13.3 | 14.0 | 14.5 | 12.7 |
| India                         | 0.9  | 1.1  | 1.1  | 1.2  | 1.5  | 1.5  | 1.5  | 1.5  | 1.6  |
| China                         | 2.1  | 2.7  | 3.4  | 3.7  | 4.4  | 5.4  | 6.1  | 7.0  | 7.6  |
| Poland                        | 9.0  | 11.2 | 13.9 | 11.4 | 12.6 | 13.9 | 13.1 | 13.8 | 14.3 |
| Turkey                        | 7.7  | 9.3  | 10.4 | 8.6  | 10.1 | 10.6 | 10.6 | 11.0 | 10.5 |
| Indonesia                     | 1.6  | 1.9  | 2.2  | 2.3  | 3.1  | 3.6  | 3.7  | 3.6  | 3.5  |
| Nigeria                       | 1.0  | 1.1  | 1.4  | 1.1  | 2.3  | 2.5  | 2.7  | 3.0  | 3.2  |

Sources: World Bank, International Comparison Program database

In the last 10 years, some countries doubled their GDP per capita and some tripled it. As a result, the share of the leading (for around 100 years) world economy – the US economy – decreased (it is still the world’s leading economy and changes in this economy influence the rest of the world). Reasonable progress was demonstrated by the Canadian economy, which had one of the highest GDPs per capita in the world in 2011 and 2012.

Unlike the G-7 countries\(^6\) (mostly European countries), which are developed countries with a high GDP per capita and demonstrated limited growth at 1-3% a year, the other countries represent the emerging market and developing economies with considerably lower GDP per capita figures and are growing much more quickly.

Special attention must be paid to regional forces: the countries with growing economies and populations (for instance, Poland, Turkey, Indonesia and Nigeria). For example, Poland became a regional leader in Eastern Europe with a fast-growing economy and, as a consequence, with growing political influence (and possibilities for increasing military power). We can expect that the economic growth of the countries that are regional leaders will continue and the “regional powers” will play a larger role not only in the regions.

Compared with the developed countries, the emerging market economies present, on average, much higher growth rates. On the other hand, growth rates in these countries are less stable (Brazil, Russia). We can observe the growing economic power of developing countries (especially in Eastern Asia) and as early as in 2008, El-Erian [10] concluded that the growing influence of countries was not so important

\(^*\) “demographic shift” and “economic centre of gravity”.
\(^5\) GDP per capita as a development index has a lot of drawbacks (for instance, the size of an economy as such and the structure of GDP, etc., are important).
\(^6\) After a historically short period (20-30 years), if the trends are the same, maybe only Germany (of all European countries) will be among the top 10 most developed countries in the world, hence the importance of the European Union’s existence.
in the 20th century and this influence will grow further. The demographic and economic centre of gravity is moving towards Eastern Asia.

There exists a less distributed evaluation of the situation based on the fact that among top companies, China’s gains are relatively minor given the significant outperformance of its stock market relative to major western markets [24]. This aspect may be important in the evaluation of other quickly developing countries.

A relatively new trend is that the influence of “hydrocarbon countries” is decreasing [10].

As we can see in Table 2, the trend of faster growth in some countries (for instance, China, India) continues. Therefore, the share of economies of currently developed countries in the world is decreasing.

Table 2

| GDP growth (annual %) for the G-7, the BRICS and regional powers |
|---------------------|-----|-----|-----|-----|-----|-----|-----|
| USA                | 4.1 | 3.0 | 2.5 | 2.3 | 1.5 | 2.4 | 2.6 |
| Japan              | 2.3 | 1.3 | 4.7 | 1.8 | 0.8 | 1.6 | 0.6 |
| Germany            | 3.0 | 0.7 | 4.1 | 0.4 | 0.4 | 1.6 | 1.5 |
| UK                 | 3.8 | 3.0 | 1.5 | 1.2 | 1.7 | 2.8 | 2.5 |
| France             | 3.9 | 1.6 | 2.0 | 0.2 | 0.7 | 0.2 | 1.2 |
| Italy              | 3.7 | 0.9 | 1.7 | -2.8 | -1.7 | -0.4 | 0.8 |
| Canada             | 5.1 | 3.2 | 3.4 | 1.9 | 2.0 | 2.4 | 1.2 |
| Brazil             | 4.3 | 3.2 | 7.5 | 1.8 | 2.7 | 0.1 | -3.0 |
| Russian Federation | 10.0 | 6.4 | 4.5 | 3.4 | 1.3 | 0.6 | -3.9 |
| India              | 4.0 | 10.5 | 9.7 | 5.1 | 6.9 | 7.3 | 7.3 |
| China              | 8.4 | 11.3 | 10.4 | 7.8 | 7.7 | 7.3 | 6.8 |
| Poland             | 4.3 | 3.5 | 3.7 | 1.6 | 1.7 | 3.4 | 3.5 |
| Turkey             | 6.8 | 8.4 | 9.2 | 2.1 | 4.2 | 2.9 | 3.0 |
| Indonesia          | 4.9 | 5.7 | 6.2 | 6.0 | 5.6 | 5.0 | 4.7 |
| Nigeria            | 5.3 | 3.4 | 7.8 | 4.3 | 5.4 | 6.3 | 4.0 |

Sources:
1) World Bank national accounts data and OECD National Accounts data files (data for 2012)
2) CIA Factbook (2013-2015)

Shifts of economic centres of gravity lead to subsequent shifts in military power (e.g. China) and make our socio-economic system less stable for the next decade(s).

Shifting centres of economic and military power are a permanent factor which works relatively slowly. Nowadays some of these changes are leading to qualitative changes and affecting the entire system. We can say that in the second decade of the 21st century (and onwards) we must deal with a transforming system with not only quantitative but also various qualitative parameters. But international organisations which were created in the 20th century have not been changed according to the new situation.

China, India, Brazil [34] and in the future the other countries must play a larger role, at least in world forums. It is necessary to understand that growth (economic, political and military power) offers these countries the possibility to establish new international organisations, and this again influences the entire socio-economic system, including the political subsystem.

2. FINANCIAL (INCLUDING DEBT) CRISIS

The financial (including debt) crisis expanded in the last two decades, first, as growing general government debts and, second, through bubbles in different markets, mostly the real estate and securities markets (we will observe only debt problems). In the period of 2007-2015, we can observe (Table 3) growing general government debts in the majority of countries. Among the 16 analysed countries, only three (India, Turkey and Indonesia) achieved a declining government debt.
Table 3

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Sources:
1) Trading Economics, World Bank national accounts data, and OECD National Accounts data files
2) Eurostat, CIA Factbook (most data for 2015)

We can observe (Table 3) that in fact the world’s leading countries (the G-7) increased their government debts, while the BRICS countries are on a lower debt level.

The leading countries increased their general government debts. The problem of growing general government debts becomes crucial if the external debt exceeds 60% of GDP [29] because this leads to negative changes in the state budget structure, as a larger part of the budget must be spent on servicing the government debt.

A perfect analysis of the reasons for growing government debts (the case of the USA) made by D. Walker [38] offers simple recommendations – expenses have to be cut (spending according to the budget size). According to D. Walker, if nothing is done, at the latest by 2030 the USA could face a financial collapse.

Three important remarks: the precondition for cutting expenses is political will and the support of society; a serious argument against cutting expenses is growing government budget deficits and the increase in total debt in a few important world states, which in any case deeply affect the world financial system and make all socio-economic systems less stable; it is possible to increase government debts (annual budget deficits are allowed) in the short term (2-4 years) in case this leads to the development (recovery) of the economy, for instance, through government investments in infrastructure.

The reason why governments increase their debts (making their annual budgets with a deficit) is simple enough. Along with the hope of stimulating the economy, an important role is played by short-term goals (one of them is to be re-elected).

An extremely important factor that nowadays influences the financial system and, through it, the whole socio-economic system, is the growing unregulated role of central banks [11]. Failures in the performance of the financial subsystem (as a result of lack of necessary regulation and as a result of the weakness of the political subsystem) make the entire socio-economic system less stable.
3. DEMOGRAPHIC SHIFTS AND POPULATION

The difference in the rates of population growth among continents and countries in the last 50 years changed our world dramatically. The population grew three times in Africa and two times in Asia, South America, Australia and Oceania, while in Europe the population growth from 1970-2015 was only 12.3%. Taking into account the standard of living, political instability and, in extreme cases, warfare, immigration to Europe exploded, and it is easy to predict (if the “rules” are the same) a further increase in immigration to Europe and North America. Rapidly growing immigration leads to instability in immigration destination countries and changes the political situation as well.

Research studies on immigration show that the total effect of immigration of low educated individuals and people without capital is negative [14; 15]. A less researched aspect of immigration is the compatibility of value systems [17]. Already in 1970 C. W. Graves stressed that “to each state is associated a particular value system…”

The existing situation is partly a result of faulty long-term policy (which is based on faulty statements) – the supply of food versus the decreasing birth rate in poor countries with high birth rates.

According to G. Heinsohn [18, 19], the problem is not only growing populations but also demographic shifts.

Criteria for the shifts [18]:

- a youth bulge exists when 30% of the men in a population are between 15 to 29, i.e. if you take 100 males from a country, 30 of them will be in this age range;
- a demographic capitulation is when per every 100 males aged 40-44, there are less than 80 boys aged 0-4.

Among the analysed countries, the worst demographic situation was observed in Germany, Italy and Japan. Over more than a decade, the demographic situation deteriorated in Italy and Japan, and only Germany has presented a slight improvement in this respect during the last few years (thanks to immigration and higher birth rates among immigrants). Canada shifted from a demographic capitulation situation, which was observed until 2010, to a demographic armament situation with a ratio of 100/828.

The same goes for Poland and Russia.

A stable demographic armament situation for more than a decade has been observed in France, the USA and the UK, with the highest ratios being presented by India, Turkey, Brazil and South Africa.

According to G. Heinsohn, a youth bulge contributes to higher crime rates. To verify this assertion, a correlation analysis was performed for the selected countries. The correlation was calculated between the number of males aged 15-29 years per 100 males aged 40-44 years and intentional homicide rates.

For the analysed countries with demographic capitulation and armament, the correlation coefficient was equal to 0.79, which shows a strong positive relationship between a country’s youth bulge and its homicide rate.

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7 Top 6 (immigration in 2014 more than 100 000 people a year) among EU countries: Germany, France, Italy, Poland (with a different immigrant composition), the Netherlands and Belgium. All these countries, excluding Poland and partly the Netherlands, demonstrated a growing number of incidents in which immigrants took part.

8 Canadian experience in improving the demographic situation must be more carefully studied.
Table 5
Number of males aged 0-4 and 15-29 per 100 males aged 40-44 for selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>2012</th>
<th>Average for 2000-2012 (0-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-4</td>
<td>15-29</td>
</tr>
<tr>
<td>Capitation or on the verge of it</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>100/59</td>
<td>100/322</td>
</tr>
<tr>
<td>Germany</td>
<td>100/57</td>
<td>100/374</td>
</tr>
<tr>
<td>Japan</td>
<td>100/56</td>
<td>100/340</td>
</tr>
<tr>
<td>China**</td>
<td>100/64</td>
<td>100/252</td>
</tr>
<tr>
<td>Demographic armament</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Africa*</td>
<td>100/208</td>
<td>100/935</td>
</tr>
<tr>
<td>India***</td>
<td>100/154</td>
<td>100/295</td>
</tr>
<tr>
<td>Turkey</td>
<td>100/127</td>
<td>100/632</td>
</tr>
<tr>
<td>Brazil</td>
<td>100/113</td>
<td>100/649</td>
</tr>
<tr>
<td>USA</td>
<td>100/98</td>
<td>100/519</td>
</tr>
<tr>
<td>Russia</td>
<td>100/95</td>
<td>100/557</td>
</tr>
<tr>
<td>France</td>
<td>100/91</td>
<td>100/437</td>
</tr>
<tr>
<td>UK</td>
<td>100/91</td>
<td>100/460</td>
</tr>
<tr>
<td>Poland</td>
<td>100/86</td>
<td>100/557</td>
</tr>
<tr>
<td>Canada</td>
<td>100/82</td>
<td>100/489</td>
</tr>
<tr>
<td>Extreme demographic armament</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaza Strip</td>
<td>100/464</td>
<td>-</td>
</tr>
<tr>
<td>Afghanistan</td>
<td>100/403</td>
<td>-</td>
</tr>
<tr>
<td>Iraq</td>
<td>100/351</td>
<td>-</td>
</tr>
<tr>
<td>Somalia</td>
<td>100/364</td>
<td>-</td>
</tr>
</tbody>
</table>

* - for 2010; ** - for 2013; *** - for 2011
Sources: OECD database; China Statistical Yearbook 2014; World Bank database; 2011 Census of India

Additional non-direct evidence of the negative influence of a “youth bubble” is the fact that a permanent war situation really exists in all countries with extreme demographic armament. These facts allow us to conclude that in order to solve these problems, changes are necessary in international policy. What is common for the three instability factors is their connection with failures of the political subsystem, which did not change in line with tremendous changes in the other subsystems. It is very important that the political subsystem does not use social science research results (at least for the last 100 years). For instance, Paretto [26] warned about the “dangers of democratic order” in the second decade of the 20th century. Nowadays, a problem related to the performance of the political system is the “increase in the number of people dependent on the state” [36]. In combination with the wish of politicians to maintain their power, it creates an essential negative effect on the political, economic and social subsystems and on the whole socio-economic system. Seeking deeper reasons for it, one can put forward a hypothesis about the connection with the dominant value system of the majority of the public.

9 A strong point for discussion about the existing political subsystem: if we assume that Paretto’s principle [26] is universal and useful for a democratic system for the purpose of exploring the performance of the democratic system, this means that 20% of voters (their interests) determine the outcome of any elections. Maybe it is possible to discuss an election system reform which is connected with taxes paid and the number of votes.

10 For instance, Nobel Prize winner J. Buchanan [4; 5] synthesized the theories of political and economic decision-making. According to J. Buchanan, politicians pursue mostly short-term goals – to be re-elected – and to achieve this, they manipulate their society. They behave selfishly and act, to some extent, out of self-interest, seeking to get as many votes as possible and to have high positions of power or large budget allocations.

The political subsystem is not able in a proper way to use the results of extremely important research studies in social science (Paretto [26], Norbert Wiener [39], James Buchanan [4; 5], Robert Mundell (1999 Nobel Prize in economics), G. Heinson [18] and many other researchers).

11 The stability of any socio-economic system is affected by value systems. A pioneer in researching value systems was C. W. Graves, and followers include D. E. Beck and C. Cowan. A significant contribution to this research field was made by S. E. Dawlabani et al. [8].
To finalise…
Many researchers try to explain the growing instability with: long economic cycles [20]; international conflicts and patterns of leadership [9]; oil prices [31]; and technological cycles [32]. However, it might be that the problem is much deeper: quantitative changes in the socio-economic system have caused qualitative changes, and instability is permanent for the socio-economic system. Our short analysis of the three abovementioned instability factors showed that the sources of instability are different speeds of changes in the subsystem; for instance, the economic subsystem is developing much more quickly than its regulation (which depends heavily on the political subsystem). We can observe failures of political systems in practically all countries. And the sources of this are connected with the value system. It is necessary to improve the political subsystem because it has to perform a very important task – it is imperative to shift to the long-term development model and withdraw from expansion [34]. Hence, arguably a new socio-economic system is emerging, potentially bringing back dynamic stability, yet this time for a comparatively long period of time.

CONCLUSIONS
1. The instability of the socio-economic system is permanent because the subsystems are changing at different speeds, and, in a certain period, a situation arises in which quantitative changes accumulate so much that the system changes qualitatively and a new system emerges.
2. The world socio-economic system is in crisis, and we cannot explain this situation with long or middle-term cycles or patterns of leadership, etc.
3. The main instability factors are long-term factors: shifting centres of economic gravity, including the emergence of new regional economic gravity centres (regional powers), financial crises (including debt crises) and population growth with demographic shifts. Nowadays, instability factors work globally; therefore, a problem solution is possible at a global level.
4. A fast-growing population and demographic armament are very serious factors of instability in our socio-economic system and these factors work locally (through increasing crime) and globally (through immigration). The way to solve the abovementioned problems is connected with necessary changes in policies, including international policy.
5. The political subsystem is the weakest part of the socio-economic system and failures of this subsystem are an additional source of instability. The existing model of democracy must be changed. As a hypothesis, we can assume that Paretto’s principle is usable in explaining the performance of the political subsystem. This means that 20% of voters determine the results of elections.
6. The political subsystem is not ready to use many social science research results, including warnings about the existing model of democracy.
7. The existing socio-economic system does not work properly, and the germs of a new system are emerging. It is a painful process. Therefore, a proactive policy has to be created. This proactive policy has to include global governance elements, including new or altered international organisations.
8. As history shows, changing the socio-economic system is a long and painful process. This means that we can predict a relatively long period of growing instability.

The same ideas were proposed earlier by researchers who used different terminology (the same ideas, for instance, were proposed by Z. Bauman [2], who used the term “culture”).

12 We get the same results after studying the case of economic development problems in Latvia [35].
REFERENCES
BUSINESS SCENARIO PLANNING FOR DECLINING INDUSTRY

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Abstract
Companies seek ways to anticipate the future of their existing business and keep it sustainable. Researchers claim that it is possible to gain such an insight into the future and that there is an appropriate methodology for doing so. How will digitalization affect our business in particular? It has never been easy to foresee the future, but a scientific approach would help. Rather than claiming an ability to predict the future, scenario planners advocate the construction of multiple stories that encompass a variety of plausible futures (Schwartz, 1991). The paper industry seems to be an excellent example of an industry declining due to digitalization. This desk research is conducted for future scenario planning of the paper industry.

Topicality of the study
We’re living in a digital age. “Everything that can be digital, will be digital” (Razorfish Annual Report, Cover Page, 1999). This statement was published 15 years ago and it is still valid today. Modern technologies are changing traditional businesses – some of them have disappeared already. Just as film cameras have been replaced by digital cameras, music players now use digital files instead of tapes. Consumers decide to go digital whenever possible. Even more, consumers prefer cloud storage and cloud processing to reduce physical file storage on their own devices. Could we call it – digitalization of hardware? Businesses have to face digitalization challenges and adapt their strategies accordingly. Will Apple Watch change the traditional watch business? How will the internet of things blur the borders between the digital and physical world? There are several theories and methodologies described by various researchers. A scenario has been defined by Porter as “an internally consistent view of what the future might turn out to be – not a forecast, but one possible future outcome” (Porter, 1985). One of the most comprehensive descriptions of future scenario planning can be found in Chermak’s (2010) publication “A Theoretical Model of Scenario Planning”. He affirms that scenario planning is believed by many to be a useful means of conducting or enhancing strategic organizational planning options (Fahey & Randall, 1998; Swanson, Lynham, Ruona, & Provo, 1998). This study uses Schoemaker’s (1995) Tool for Strategic Thinking to foresee future scenarios for a declining industry. This tool uses 2 axes of relevant propositions identified by the researcher and allows us to identify 4 different future scenarios. Scenarios are not predictions but can provide a deeper foundation of knowledge and self-awareness in approaching the future (Harvard Business Review, May 2013). Scenarios provide the right framework for appreciating fundamental long-term choice, which is not the same as next year’s annual plan (Voser, 2009). The demand for printing and writing paper is decreasing due to digital alternatives. Documents are reviewed, commented on, signed and published on PC screens, and stored in cloud storage and most of them are never printed. EDI systems allow for connections between trade companies and secure all order-confirmation-invoice workflows directly from PCs. Advertisements are delivered on screens of static and portable devices instead of printed media. There is no need to go to a bookstore and purchase the latest bestseller – e-books are downloadable in seconds. There is no need to print concert or flight tickets – scanners can read QR codes directly from a smartphone screen. What will happen to paper printed media in the digital age? Is the paper industry sustainable? Can it survive and meet the challenges of digitalization? How do we keep paper and printing-related businesses sustainable? What are the environmental impacts of paper versus digital? Can we foresee scenarios of further development for the paper and print industries? The paper industry is an important part of the EU economy. The pulp and paper industry provides 180,000 jobs in Europe directly and 1.5 million in the value chain. It has a turnover of 75 billion euros and adds 15 billion euros to the EU’s GDP. Pulp and paper mills employed about 420,000 workers in 1992 and 180,000 workers at the end of 2015 (CEPI Key Statistics 2015). The graphic industry in the European Union represents around 118,000 companies – more than 6% of the EU’s total manufacturing industry (Data from Eurostat, 2014). Employment in
the industry stands at around 685,000 people with a turnover of around 88 billion euros (Intergraf, Unfold the Benefits of Print, 2014).

**Statement of the problem**

Digitalization challenges traditional businesses, causing a decrease in demand. Scientific future planning can help to maintain the sustainability of the business and detect interrelations with other industries in the value chain.

**Research Study, Subject and Hypotheses**

The research study constitutes future business scenario planning for a declining industry. The paper industry is used as an example of an industry influenced by digital alternatives for paper. The research subject is the interrelation between industry statistics, PESTLE analysis and possible future scenarios.

**The research hypotheses are:**

1. Future scenario planning will generate recommendations for business sustainability.
2. Future scenario planning will reveal connections with other industries in the value chain.
3. The paper industry is declining because of digital alternatives to paper.
4. The demand for paper will continue to decrease.
5. Electronic alternatives are environmentally friendly compared to paper.

**Research Aim and Main Tasks**

The aim of the research is to prepare scientific future scenario plans for a declining industry. The main tasks include:

1. Quantitative research by gathering data from industry-related associations, organizations and statistical institutions. Data accuracy is cross-checked through comparison with Eurostat figures.
2. Data analysis and relevant conclusions.
3. Identification of key drivers.
4. Comparing the environmental impact of paper and electronic media.
5. PESTLE analysis for the industry.

**Research Limitations**

The Research covers European Union Countries, Norway and Switzerland.

**Theoretical and Methodological Basis for the Research**


**Theoretical Significance and Scientific Novelty of the Research**

Future scenario planning helps us to foresee developments in declining industries and adapt business models when this is necessary to maintain sustainability. The methodology is simple enough to be adapted for other industries as well. The research will reveal connections with corresponding industries in the value chain and identify possible impacts.

**Research Methods**

Quantitative research methods are used by gathering data from industry-related associations, organizations and statistical institutions. To ensure data accuracy the figures are cross-checked with Eurostat.

**Research Design**

The research design consists of the following steps: collecting statistics about the industry, analysing the collected data and identifying the key drivers, completing a PESTLE analysis, coming to relevant conclusions and building future scenarios on a 2D scenario plot area.
To be able to proceed with relevant future scenarios, it is essential to collect statistics about the respective industries. The statistics have to be accurate and detailed enough to reveal the real causes of the decrease in demand. It might not be enough to collect statistics for a particular industry alone. In this research the following statistics are used: CEPI – Confederation of European Paper Industries – for the paper industry’s key statistics; Intergraf – European Federation for Print and Digital Communication – for the print industry’s key statistics; Creative Industries Economic Estimates (published by the UK government) for publishing products according to end use; the Federation of European Publishers for book publishing statistics; and Zenith Optomedia for advertising expenditures in different media. All these data were cross-checked with Eurostat data to ensure data accuracy. After data collection and analysis it was possible to make a PESTLE analysis as well as plan future scenarios.

**Key Statistics for the Pulp and Paper Industry**

To be able to build a future scenario for a declining industry, it is necessary to find the real causes of the decline. The pulp and paper industry has been under pressure for many years. Only half of the paper mills that existed in 1991 are still in the production stage today. Over 24 years this industry closed 717 pulp and paper mills and employment decreased by 256,449 persons in European Union countries alone.
By comparing tons produced and the number of employees involved, the research can illustrate the average weighted productivity in the industry (export-import data are ignored), represented in Table 2.

Despite the decreasing number of pulp and paper mills, the industry can still supply the paper demanded. Pulp and paper mills are becoming integrated, able to connect the value chain from raw wood to cut paper. Paper mills grew in size, output and volume and reduced their number of employees at the same time. That was possible due to automation and rapid technological development as well as continuous investments in R&D. The industry counted 3 billion euros in investments in 2013, a share of 23% of global paper production, maintaining an average EBIDTA of 11.4%. The investment rate in the paper industry is two times higher than the average in the whole manufacturing industry. The industry is important for the trade balance – the European paper industry exports 21.6% of its production. Environmental performance has improved year by year and 56% of energy used by the paper industry is bioenergy; CO2 emissions have been reduced by 43% since 1990 (CEPI Sustainability Report 2013). Most productive paper mills are able to produce about 500,000 tons of paper per year with just 230-280 employees in total, which is 4 times more output than average in the manufacturing industry. Paper machines grew in size to a 6m paper roll width, reaching paper output speeds of more than 100 km per hour. Productivity records have been announced every year since 2004. According to CEPI statistics, paper demand in the EU has been decreasing since 2011, and to find out what the real reasons are behind this, the research differentiates paper demand according to paper grades. There are many paper grades produced by the industry – paper for industrial and hygienic use, packaging paper, cigarette paper, cardboard boxes and book-binding boards, newspaper, office paper, magazine paper and much more. Separating paper into grades according to end use will allow us to find the reason for the decline of the industry.

Total paper demand has been decreasing since 2008, when the world faced a financial crisis. As we can see in Table 4, total paper consumption has been relatively stable since 2012, varying between 77 and 76.5 million tons, while graphic paper consumption has been decreasing constantly.
Figure 3 shows that the decrease in graphic paper demand is the main reason for the overall decrease in paper demand in Europe. In the year 2000, demand for graphic paper was almost 46 million tons, and it decreased year by year to 29 million tons. Just to understand how much a decrease of 17 million tons of paper is – one truck can carry 24 tons of paper. European demand for graphic paper decreased by 709,000 trucks of paper, or approximately 190 trucks every day, over the last 15 years. The highest total demand for paper in Europe was in 2008, reaching 90 million tons.

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<tbody>
<tr>
<td>All Paper Consumption</td>
<td>61,533</td>
<td>85,087</td>
<td>88,219</td>
<td>89,865</td>
<td>80,761</td>
<td>82,984</td>
<td>81,498</td>
<td>77,364</td>
<td>76,419</td>
<td>77,080</td>
<td>76,830</td>
</tr>
<tr>
<td>Graphic Paper Consumption</td>
<td>44,304</td>
<td>45,947</td>
<td>42,345</td>
<td>40,949</td>
<td>34,714</td>
<td>36,318</td>
<td>34,896</td>
<td>32,655</td>
<td>31,056</td>
<td>30,249</td>
<td>29,061</td>
</tr>
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Table 4

The end use of graphic paper is printed media, which is a result of the publishing industry. Some publishing industries are very dependent on advertising – like newspapers and magazines, as well as direct mailing, catalogues, advertisement brochures and leaflets.

The percentage of publishing according to category is presented in Figure 4.

![Figure 3. Paper demand by paper grade.](source)

![Figure 4. Publishing end use according to product category.](source)
Newspapers and magazines represent 59% of publishing products according to turnover. These products are especially dependent on advertisement area sold. The decrease in demand for graphic paper can be explained by the switch in advertising expenditures from printed media to electronic media. Newspapers and magazines are substituted by Internet portals and delivered on the screens of electronic devices. In 1998, printed media received 57% of advertising expenditure in Europe; by 2014 the figure had decreased to 9% (Zenith Optimedia, 2014).

Table 5

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</tr>
</thead>
<tbody>
<tr>
<td>Ad Spend in Printed Media</td>
<td>57%</td>
<td>51%</td>
<td>47%</td>
<td>43%</td>
<td>38%</td>
<td>36%</td>
<td>39%</td>
<td>39%</td>
<td>42%</td>
<td>46%</td>
<td>32%</td>
<td>21%</td>
<td>15%</td>
<td>13%</td>
<td>12%</td>
<td>11%</td>
<td>10%</td>
<td>9%</td>
</tr>
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Source: author; Data source: Zenith Optimedia (2014)

What about books – representing 26% of turnover in the publishing industry? Books in Europe remain printed on paper; e-book popularity was below 11% in 2015 (Federation of European Publishers, 2015). There are many reasons for the low popularity of e-books in Europe, reported by various researchers. One of the reasons is that many European countries have lower taxation on printed books, while e-book VAT taxes are applied without any deduction, which makes e-book pricing less attractive. Another reason is Amazon’s price policy – they price e-books very similarly to printed books; consumers pay just 2-3% less for an e-book than for a hard copy.

Key industry drivers

Research can identify the key drivers to be included in the final version of future scenario planning. The axes will be Technology Acceptance Level (high/low) by consumers and Technology Development Speed (fast/slow). The real cause of the decrease in demand for paper is printing and writing paper (also called graphic paper). The decrease in demand is most visible in documents and printed publishing, such as newspapers, magazines and books, including school materials.

Environmental sustainability of paper versus electronic media

There are many myths and stereotypes in the discussion of the environmental impact of the paper industry. The main concerns are related to the use of forest and energy resources. The paper industry uses significant amounts of forest resources; at the same time, European forests have grown by over 30% since 1950 and are increasing in size by an area four times the size of London City every year (World Forest Resources, 1953 and UN FAO Global Forest Resources Assessment, 2010). In fact, 90% of deforestation is caused by unsustainable agricultural practices (Underlying causes of deforestation,
World Rainforest Movement and UN FAO, 2013). 55% of the world’s wood harvest is used for energy and 25% for construction. There are some other uses but paper only takes up 11% directly and in addition can utilize up to 7% from construction waste (FAOSTAT, 2011). In Northern Europe, where almost all ancient forests are protected, paper comes from managed semi-natural forests where the cycle of planting, growing and logging is carefully controlled. Historical concerns in Northern Europe and Canada have now been largely resolved through co-operation between legislators, campaigners and forest industries to protect ancient forests. 82.7% of the pulp used in the EU originates from Europe. (CEPI Sustainability Report, 2011). All pulp imported to Europe is covered by the EU Timber Regulation, which prohibits the import of wood products from illegally harvested timber. Well managed forests provide a natural habitat for wildlife. There is always room for improvement and the European Environment Agency (EEA) has stated that “forestry practice in Europe is developing in a way that can be considered good for biodiversity.” (EEA, The European Environment, State and Outlook 2005). Forests in Europe are planted – planted forests can be environmentally sound sources of renewable energy and industrial raw material. (WWF, Living Forest Report, 2012, Ch 4). The paper industry has a number of respected certification schemes ensuring the paper used has come from a sustainable forest source. There are some 30 schemes in existence, but the two main auditable certifications that have emerged are the Forest Stewardship Council (FSC®) and the Program for the Endorsement of Forest Certification (PEFC®). The paper industry uses energy as well. On average it takes 500 kilowatt hours to produce 200kg of paper, the average consumption per capita in Europe. The paper industry is the biggest user of renewable, low carbon energy and 54% of the energy used in European paper making is biomass-based – more than in any other sector. Recyclable paper is made from wood, a renewable carbon storing resource. (EMIP, The Facts of Our Value Chain, 2008). It is hard to believe, but reading a newspaper can consume 20% less carbon than viewing news online. With a reading time of 30 minutes per day the environmental impact of a web-based newspaper is, in general, in the same range as a printed newspaper’s environmental impact. (Swedish Royal Institute for Technology, Moberg et al, 2007). The sector Pulp, Paper and Print is one of the smallest greenhouse gas emitters on the planet, responsible for just 1.1% of CO2 emissions. It is important to remember that paper is recyclable – 74% of paper is recycled in Europe (CEPI Key Figures, 2014) – while electronic waste is becoming a serious problem. Electronic waste is now the fastest growing component of the municipal waste stream. The amount of electronic products discarded globally has skyrocketed recently with 20-50 million tons generated every year. In Europe, e-waste is increasing by 3-5% a year, almost three times faster than the total waste stream. (Greenpeace, The e-waste problem, 2013). The main conclusion is that use of paper is no less environmentally friendly than electronic alternatives. Paper is a renewable, sustainable and recyclable product. Paper is produced from renewable resources, using bioenergy and producing low CO2 emissions compared to other industries.

**PESTLE Analysis of the Paper Industry**

**Political factors**

Many EU countries support paper printed books with a lower VAT rate. Some EU countries have a fixed book price policy – e.g. a particular book price is exactly the same in all bookstores. A fixed book price encourages consumers to purchase the printed book. Some countries have additional tax on data storage devices, including e-book readers. The paper industry uses bioenergy and this energy source is supported by EU countries with special rates and lower taxes.

**Economic factors**

Paper is the cheapest and most reliable information storage system by far. Consumers in the EU can afford portable devices with high resolution screens. Publishing can be cheaper per copy on electronic devices than on paper; however, this is not always reflected in the end-user price. Many newspapers and magazines are not printed on paper anymore; only e-versions are available. Advertising expenditure is moving to electronic devices – away from paper printed media.

**Social factors**

Portable devices, such as smartphones and tablet PCs, are becoming popular for data access and storage. Consumers are spending more time on social media networks. News can be delivered immediately on electronic devices. Messaging services are used for information exchange – both
personal and business. Free-of-charge newspapers (like METRO) are becoming a publishing phenomenon in big cities. Self-publishing is growing compared with the previous decade.

**Technological factors**

Printed paper media is being substituted by electronic alternatives – static and mobile devices, mainly PC and tablet screens. 4G and LTE mobile networks are developing quickly in all EU countries, allowing high-speed data access and transfer. Documents are being printed less. Batteries are becoming faster-charging and longer-lasting. Screen resolution increases every year. Wi-Fi coverage is growing.

**Legal factors**

Copyrights are well protected in the EU. Content authors and publishers enjoy a safe and functional legal environment.

**Environmental factors**

Forest areas are growing, the resource is well managed, and biodiversity is maintained according to EU guidelines. Several certification systems for sustainability are in place and accepted by forest owners. Paper recycling in Europe is close to the maximum possible. Waste management provides the possibility to separate paper from other waste. The paper industry’s CO2 emissions have been reduced and are considered as very low compared to other industries. Electronic waste is becoming a serious problem.

**Future scenarios based on Schoemaker’s (1995) Tool for Strategic Thinking**

The scenarios are built on a Technology Acceptance by Consumers axis (vertical) and a Technology Development Speed axis (horizontal), allowing us to plan 4 different future scenarios for the paper industry.

![Figure 6. Future scenarios based on Schoemaker’s (1995) Tool for Strategic Thinking](source: author)
Three of the four future scenarios foresee a decrease in the demand for printed paper. That will have an effect on three industries – the paper, graphical (printing) and publishing industries. Three of the scenarios predict the need of the paper industry to diversify and switch its production capacities to other paper grades. There is no scenario where the printing industry grows. All the scenarios predict a business model change for the publishing industry.

**Research hypotheses confirmed:**
- Future scenario planning will generate recommendations for business sustainability. The need for diversification has been confirmed.
- Future scenario planning will reveal connections with other industries. The decrease in demand for paper will impact other industries as well. Future planning identifies directions for the paper, printing and publishing industries – these industries will have to adapt their business models. There is the possibility to launch more in-depth research for each industry based on the same methodology, especially applicable in the case of strategic business decision-making such as vertical or horizontal integration.

**Research hypotheses partly confirmed:**
- The paper industry is declining because of digital alternatives to paper. The decline is connected not only to the fast development of digital technologies, but also to consumer acceptance of these technologies. Consumers are changing their habits, which is changing advertisement expenditure allocation, which is increasing the pressure on publishing products like newspapers and magazines. It is a combination of factors which is causing the decrease.
- The demand for paper will continue to decrease. The decrease in total demand for paper is partly counterbalanced by the increase in non-printing paper grades. The demand for printing paper will decrease; this is confirmed in three possible future scenarios out of four.

**Research hypotheses not confirmed:**
- Electronic alternatives are environmentally friendly compared to paper. A direct comparison of these technologies is not relevant. Both have their pros and cons, but we can state that paper is environmentally friendly, sustainable, renewable and recyclable – the key indicators are favourable for paper, not for electronic alternatives.

**Main Conclusions and Recommendations**

**Conclusions**
1) Data analysis confirms that the total demand for paper has decreased in the EU.
2) The demand for printing and writing (also called graphic) paper has decreased considerably, while demand for other paper grades such as paper for packaging and non-printing paper grades is increasing, which partly compensates for the total decrease in demand.
3) The demand for printing and writing paper will continue to decrease.
4) The decrease in demand for printing and writing paper will have a negative influence on European print industries.
5) The change in consumer habits in combination with technological development will challenge the publishing industry.
6) Paper is an environmentally friendly way of delivering and storing information.
7) There is the possibility to launch more in-depth research for each industry based on the same methodology, especially applicable in the case of strategic business decision-making such as vertical or horizontal integration.

**Recommendations for the industry based on future scenario planning**
1) The paper and pulp industry remains healthy, but needs to adapt – convert production from decreasing paper grades to increasing ones, maintain productivity and diversify when necessary. Printing paper production has to be decreased and production capacity needs to be converted to packaging and non-printable paper grades.
2) The printing industry needs to look into long-range planning and diversification of business – there is no scenario predicting an increase in demand for printed media. Book printing seems to be more sustainable than other printed medias.
3) All the industries above should use environmental factors to educate against stereotypes, explaining the real consequences of using different technologies.

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COMMERCIAL BANKS AND FINTECH COMPANIES IN THE DIGITAL TRANSFORMATION: CHALLENGES FOR THE FUTURE

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Abstract
Innovations in technologies are changing consumers’ behaviour and their understanding of financial services’ great importance for the financial industry today. It is a great challenge for “traditional” banking to stay on track by understanding and accepting this change when there is no way back. Banking is no longer a place you go, but something you do (King, 2013). Many researchers and industry experts are discussing the future of FinTech companies and the threat that they may possibly replace banks. As Annika Falkengren (2015), CEO of Skandinaviska Enskilda Banken, has said, “They look like banks, they talk like banks, but are not regulated like banks.”

The research problem of the present research is formulated as follows: ‘will non-banking entities be able to generate competition to such an extent that the lines of business which are traditionally considered to belong to banks will no longer be their privilege?’

The aim of the research is to investigate, evaluate and compare the interaction between FinTech and commercial banks and the development trend of commercial banking, taking into consideration the influence of FinTech companies on traditional business models.

Research methods applied:
- Review of the literature and secondary data;
- Primary data collected by survey and interviews;
- Analysis of gathered data and analysis of financial parameters of FinTech companies, such as investments made in these companies by international banks.

Research questions:
RQ1: What is the substance of FinTech, what kind of services are offered by FinTech, and to what extent are customers aware of FinTech?

RQ2: Are banks investing in FinTech and which of the FinTech business areas are most attractive for investors?

Research limitations
This research has limitations related to the collection of both primary and secondary data. The pool of survey respondents and experts is limited and does not cover worldwide locations, being from Baltic countries, Sweden and Finland. In total 231 respondents participated in the survey.

Keywords: Digital transformation, commercial banks, FinTech companies

JEL codes: M15, O31, O16

INTRODUCTION
According to a publication by The Economist (The Economist, 2015), FinTech companies attracted around $12 billion US dollars in investments last year, and some of the companies have gone public. But what is the detailed definition of a FinTech company? One definition is given by David Lee Kuo Chen (Chen, 2015) in his paper “Emergence of FinTech and LASIC (Low margin, Asset light, Scalable, Innovative, and Compliance easy) Principles”. He states that “Fintech refers to innovative financial services or products delivered via technology”. According to the definition found in the Oxford Dictionary (Oxford Dictionary, 2015), FinTech comprises “computer programs and other technology used to support or enable banking and financial services”. A definition preferred by Accenture considers FinTech companies as “the ones offering technologies for banking and corporate finance, capital markets, financial data analytics, payments and personal financial management”. (Stockholm School of Economics, 2015). A Silicon Valley Bank report on London and Global FinTech does not define
FinTech but includes companies that use technology in lending, personal finance, payments, retail investments, institutional investments, equity financing, remittances, consumer banking, financial research and banking infrastructure. Still other definitions include both e-commerce and cybersecurity as aspects of FinTech. (Stockholm School of Economics, 2015).

Summarising the quotes above, the authors could provide the following definition of the term: FinTech is an industry oriented toward arranging financial services for private individuals and industries with the aim of providing customer-oriented solutions in the most efficient way and at the lowest cost possible, ensuring this via innovation and technology. Exploring the current FinTech market more deeply, the authors have found that these companies are currently focusing on four main areas: payment-related services, wealth management, peer-to-peer lending (P2P lending), and crowdfunding.

In order to examine a different view on FinTech companies, a report by PricewaterhouseCoopers, “States of Guernsey. A strategic vision for FinTech”, published in July 2015 (PwC, 2015), could be examined. In this report (PwC, 2015) FinTech is defined as a combination of innovative financial services and the availability of capital through the use of new (digital) technologies, such as crowdfunding. FinTech is also considered as a trend encompassing a wide area, ranging from technology used in existing financial services organisations to new consumer products and new market players competing with existing leaders. FinTech includes new models, such as cryptocurrencies, and is rapidly evolving in any area of financial services where technology is the key driving factor. As a result, FinTech can be defined as a term not only related to single methods and solutions or to traditional financial institutions looking to streamline their processes and emerging technologies, which seek to disrupt traditional industries. The term covers all of the above; the key question is whether these players will be able to unite forces, to make financial services even better, or whether they will choose the path of rivalry and competition.

**FinTech Summary**

FinTech can be described as a technologically driven process in the financial industry which introduces new working methods and approaches to standard processes. It aims to enhance the customer experience and increase process efficiency at traditional financial institutions and it opens market doors for new entrants who re-design traditional services so that they are more personalized, transparent and accessible for via digital channels, offering potential customers alternatives to traditional services provided by the financial industry.

The authors suggest the following division of activities in the FinTech area:

- **Service-oriented** – development of technologies related to services which are traditionally provided by financial institutions, such as fund transfers or card payments, lending and investment, P2P lending, crowdfunding, or foreign exchange.
- **Data-oriented** – solutions and technologies devoted to collecting, processing and analysing information. Although banks have not been paying much attention to the big data phenomenon, recently there are signs that this tendency is changing.
- **Process-oriented** – after the financial crisis of 2008, banks all over the world re-defined their operating models. Nowadays, banks are introducing so-called cost caps and have started working on increasing efficiency and process automation.

**Theoretical Framework**

The interaction between FinTech and commercial banks is considered as the dependent variable. The following independent variables affect the dependent variable: the financial industry, regulations, customer behaviour, public interest, investments.

The conceptual model of the research is shown in Figure 1.

With regard to financial technology, the financial industry is influenced by: Internet usage, use of mobile payments, the invention of digital currency, and the introduction of real-time payments. **Regulations** consist of: legislation towards different financial services and anti-money-laundering, know-your-customer issues, etc. **Customer behaviour** is impacted by: Internet usage, use of smartphones, lack of necessity to visit a physical branch. **Public interest** may be influenced or imposed by a crowd, where mass media and social networks play a big role. **Investment** flow and investment amount may be influenced by two factors: investments in financial technology or FinTech startups and foreign direct investment in emerging markets.
Research Question 1: What is the substance of FinTech, what kind of services are offered by FinTech, and to what extent are customers aware of FinTech?

Research Question 2: Are banks investing in FinTech? And which of the FinTech business areas are most attractive for investors?

Analysis of investments made by banks in FinTech companies

The authors have analysed investments in FinTech companies made by some of the world’s largest banks and the expected outcome of the analysis is to identify the areas of a greater interest on the part of banks with regard to some of the companies. This provides the basis for identifying what potential actions banks could undertake in the nearest future with regard to FinTech and innovative technologies.

Based on this information about banks’ investments during the past five years, the following taxonomy for business areas engaged in FinTech is proposed:

- Big data
- Trading
- Payments
- Billings
- Investments
- Insurance
- Identity Management
- Loan Management
- Lending
- Messaging

By analysing a number of companies which have received investments through financing rounds and dividing these companies into various FinTech areas, the authors determine which of the areas are of greatest interest for the banks which were leading or taking part in the investment rounds. Given that the number of companies, from one or another business area, which have received investments is only one aspect, the total amounts which were invested in the companies during the financing rounds were
analysed as well for more grounded conclusions. In order to estimate the division of investments by business area (see Table 1 below), the biggest companies situated in the USA, Sweden and Norway were analysed.

### Table 1

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Data</td>
<td>6</td>
</tr>
<tr>
<td>Trading</td>
<td>5</td>
</tr>
<tr>
<td>Payments</td>
<td>7</td>
</tr>
<tr>
<td>Billing</td>
<td>2</td>
</tr>
<tr>
<td>Investment</td>
<td>3</td>
</tr>
<tr>
<td>Insurance</td>
<td>1</td>
</tr>
<tr>
<td>Identity Management</td>
<td>1</td>
</tr>
<tr>
<td>Loan Management</td>
<td>1</td>
</tr>
<tr>
<td>Lending</td>
<td>2</td>
</tr>
<tr>
<td>Messaging</td>
<td>1</td>
</tr>
</tbody>
</table>

*Source: created by the authors*

As we can see, the major areas of interest are big data, trading and payments. A smaller amount of interest can be seen in billing, investment and lending and the least amount of interest can be seen in insurance, identity management, loan management and messaging.

Most of the companies from the researched list provide card-based payment services and the reason for this could be that card payments are based on the ISO format and are usually made in real time. In the case of person-to-person transfers, this means that the payment beneficiary can receive the money almost simultaneously with the confirmation of payment. The attractiveness of card-based payment solutions is also based on the fact that card payments are becoming more and more common in our society. The processing of such transactions brings less risk to banks that work with cash and the same applies to merchants. The conclusion made based on the information described above is that banks see a big future in card payments and realize that this network could become the prime payment network for private individuals.

The next biggest area of interest for banks, by both number of companies which have received investments and the invested amount, are companies working with data analysis and big data. Analytical software is becoming more and more advanced and is now capable of building complex models. In addition to this, along with digitization, the amount of information available to banks has grown tremendously. Currently it is becoming evident that such information can offer a deep insight into customer habits, and banks are examining ways to gather, analyse and make conclusions based on this analysis. Big data might be a key to answering this challenge, and banks investing in companies which are developing analytical software might serve as proof of this.

The third group of companies which have received investment are involved in trading. Although the total invested amount for these companies is smaller than for billing and lending companies, some of these companies are offering a different approach to traditional investments and are also applying a global approach. The authors suggest that banks are investing in these companies since they can use some aspects of the services the companies are providing in order to enhance their own services.

The remaining groups, which have not yet been described in detail, are related to the following areas: billing, identity management, loan management, lending and messaging.

Of the examined companies, only those classified under billing and lending have received a slightly larger amount of interest from investors and especially banks. The interest shown by banks in electronic billing solutions seems quite logical, since the ability to provide customers with online or electronic services definitely enhances the customer experience and also allows both banks and customers to automate and streamline accounting processes.

On the other hand, investments in peer-to-peer lending platforms are a bit harder to explain, since currently these platforms are considered to be able to create a considerable amount of competition for banks in the nearest future. But since the popularity of these platforms is growing, the authors would suggest that, although most probably banks will not be able to apply the peer-to-peer lending model to
their services, lending is being performed between two parties without an intermediary.

**Interview with experts – main results**

As part of the research the authors have interviewed several experts from different areas – banking, IT and education areas – from the Baltic states and Ukraine.

**Five questions were formulated concerning the topic:**

- Are you familiar with the term "FinTech"? Can you indicate if it is present in your area of expertise?
- Have you recently experienced a strong presence of non-banking service providers in areas traditionally associated with banks (alternative payment providers, lending, etc.)?
- Do you see an increased amount of interest on the part of international corporations in investing in alternative financial solutions? If yes, describe some examples.
- In your opinion, do non-banking service providers pose serious competition for banks in the nearest future? (e.g. fund transfers, lending, forex, etc.)
- What is your view on digitization within commercial banks? How would you evaluate digitization of services in the banking industry?

The 13 experts were from Latvia, Lithuania, Estonia and Ukraine and were top managers and chief specialists from: the banking area – 6; a brokerage company – 1; IT development companies – 3; higher education institutions – 3.

Summarizing the experts’ answers, the authors concluded that, in the case of the Baltic states and Ukraine, most industry experts and academics have heard about FinTech, but have never used the services personally. At the same time the population in the United Kingdom and other European countries is using FinTech services to a greater extent and these services are much more popular there. In the Baltic countries people are slightly more conservative, still preferring banks as the main source of financial services.

The interview participants believe that bigger companies invest heavily in new technologies and startups such as FinTech companies, believing it is worth their investment. Those startups may become stronger due to better offerings for customers – quicker, cheaper, and easier compared with traditional offerings. Almost all of the industry experts interviewed believe that banks will continue to be the main market players, because only they have access to real money, and they own the infrastructure unless FinTech creates its own. Banks are also more trustworthy and compliant when it comes to anti-money-laundering or know-your-customer issues. Digitization within commercial banks should be considered as an essential tool for keeping their market share. At the same time the experts assumed there is no real threat of banks disappearing from the financial sector. Only banks have access to real money; they own the infrastructure of money transaction and they are regulated in a way that prevents money laundering activities and terrorist financing. However, commercial banks should keep track of new technologies in order to provide their customers with the best solutions, not expansive, quick and easy services. FinTech will be able to compete with financial giants only if a new infrastructure is built, an alternative to the one banks have. But for now this is not even in conception. FinTech actually helps banks to go digital because of the new ideas startups have and its inability to operate completely independently.

**Summary of the interview data**

A. T. Kearney, a global management consulting firm, claims in its study “Time to Reinvent Your Banking Model” (2015) that internet and mobile banking are becoming the main contact points for customers as they value simplicity, transparency and convenience highly. At the same time experts think banks still have a strong position, and customers will prefer banks due to security reasons and anti-money-laundering aspects. Banks have access to real money and they own the infrastructure, so that FinTech companies need to interact with banks or become banks themselves. Innovative blockchain technology could be independent in theory, but there are still a lot of issues for its introduction in practice. However, FinTech companies are presenting themselves as serious business opportunity for banks and other financial institutions. There could be a combination between a classical bank and a new FinTech solution, their cooperation, in order to deliver the best to the client. The following conclusion could be made: banks are going digital, keeping up with the changing environment. The core minus is that banks still need to take into account their existing infrastructure while developing completely new solutions and digitizing their services.

In order to analyse customer behaviour, a public survey was made. The survey consisted of 9 questions,
divided into two parts; the first part consisted of personal questions in order to be able to divide respondents into various groups during the analysis, while the second part consisted of questions related to innovative financial services. The survey was conducted via a web service, in April 2016, with 231 respondents.

Among the respondents, a large part were aged 25 to 34 years – 53%; those aged 35 years and older made up 34%, while 14% were aged 18 to 24 years. As the authors were examining the situation in the Baltic and Scandinavian markets, the target audience was located in Latvia, Estonia, Lithuania, Sweden and Finland. The residential breakdown of the respondents was as follows: Latvia – 34% (79 respondents); Estonia – 15% (35 respondents); Lithuania – 17% (38 respondents); Sweden – 20% (45 respondents); Finland – 15% (35 respondents). The largest group of respondents stated that they were employed in banking, insurance or finance – 41%; the breakdown for other business areas was as follows: IT and software development – 16%; education – 11%; public services – 12%; “other” – 22% (telecommunication, logistics, engineering, legal and some other areas). Summarizing the general information about the respondents, the authors believe that the group is sufficiently diversified, taking into consideration age, area of employment and country of residence, in order to gain objective and meaningful insight as a result of the survey conducted.

In the given research the authors asked a question about the frequency of bank service usage where respondents had to choose between a frequency of once a year or more seldom, once every six months, once every three months, once a month, once in two weeks, and more than once a week. Surprisingly, the answers divided up approximately equally with 16-17 % for each option. 52% of the respondents were familiar with the term FinTech itself, while 48% were not. The authors could not identify any correlation between age of respondents or country of residence and knowledge of FinTech, which is natural. A slightly bigger percentage of banking employees is familiar with the term compared to other areas of employment, but this is most probably linked to the fact that for banks, financial technology, digitisation of services and competition created by non-traditional service providers and possible consequences currently is a hot and widely discussed topic. The authors suggest that respondents’ familiarity with the term FinTech depends on people’s interest in news in the world of finance and technology.

The next question was aimed at clarifying whether respondents are using non-banking service providers for banking services. It was explicitly stated in the question that micro financing companies are not considered to be non-banking service providers in the scope of the survey. 62% of respondents have used non-banking service providers for traditional banking services at least once. Below, in Figure 2, the respondents’ ranking of the most popular non-banking service providers is shown.

![Figure 2. The respondents’ ranking of the most popular non-banking service providers.](Source: created by the authors)
While looking into correlations between the answers given above and respondent groups, the authors determined that younger respondents are more likely to use non-banking service providers; on the other hand, respondents employed in banking and finance showed less certainty for such a choice and more often chose one of the unlikely options or indicated that they didn’t know how to answer the question. A high level of uncertainty, which non-banking service providers are still associated with, combined with some security concerns, may be the reason for such behaviour.

Asking about the key factors when selecting service providers showed the most essential aspects – see Figure 3.

![Figure 3. Factors influencing the selection of a service provider](source: created by the authors)

One of the most essential questions in the survey was the question as to what extent each service factor is important when choosing a non-banking service provider – see Figure 4.

![Figure 4. Service factor importance](source: created by the authors)
CONCLUSIONS AND DISCUSSION

- Banks are very interested in investing in the improvement of process efficiency and are most concerned with digitization, process automation and improving straight through processing levels.
- Banks are interested in creating a secure centralized communication network, appropriate for new market demands, currently considered to be the only worldwide secure communication network for financial institutions.
- The most interesting FinTech area for customers, according to the survey, is payment services. However, FinTech services are not as popular in Latvia and the Baltics as they are in the Nordic countries.
- Banks have strong market positions, and more customers prefer to use banks due to security reasons and trust. It is still a challenge for FinTech companies to build trust and prove their reliability compared with traditional banks.
- Banks are subject to regulations, where FinTech still is not. However, a fully digital bank will be possible when virtual money becomes real and easy to transfer. There should be a combination of traditional banking and FinTech to deliver the best solutions for customers.

RQ1: What is the substance of FinTech, what kind of services are offered by FinTech, and to what extent are customers aware of FinTech?

FinTech is an abbreviation for financial technology. It introduces new working methods and approaches to standard processes. It aims to enhance the customer experience and increase process efficiency at traditional financial institutions as well as re-design traditional services to become more personalized, transparent and accessible via digital channels, offering alternatives to traditional services provided by the financial industry.

In Latvia and the Baltic region, a very small number of people is ready for FinTech; most are still loyal to traditional banks. However, in Scandinavia, many people are moving to non-banking providers, and it is becoming a trend.

RQ2: Are banks investing in FinTech? And which of the FinTech business areas are most attractive for investors?

Banks are still strong in their structure, but they understand the need to be fast in order to compete with new technologies. Many banks are investing in FinTech companies or buying them to make their services more digitized and to offer new solutions. The business areas they are most interested in are payments, big data and trading.

RECOMMENDATIONS

1. Banks must invest primarily in digitization and innovative solutions, such as automation of services, new payment infrastructure, and analysis of big data. In order to generate ideas, banks should have innovation labs inside their organizations and look for interesting ideas outside them, e.g. on startup forums.
2. Banks should analyse and use the information they own about their customers and their transactions, not only on a know-your-customer basis, but in general. Use of such data will improve the understanding of customer needs and behavioural patterns and also drive operational efficiency and effectiveness throughout the organization.
3. Banks should transfer new business processes related to customer service online. As we discovered during this study, use of online banking and mobile banking applications is growing among banking customers. If banks were to introduce agreement confirmation online with the help of a mobile banking application, it would bring benefits to both banks and customers. The main recommendation in this regard would be to explore such business possibilities and implement them in order to retain and attract more customers with easily accessible and efficient service.
4. FinTech companies need to pay more attention to popularization of their services and advertising in order to attract more customers and establish public trust.

Further Research

Taking into account the defined limitations, the present research could be repeated in the future with a larger sample size.
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EFFICIENCY ASSESSMENT OF BALTIC PENSION FUND MANAGEMENT COMPANIES

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Abstract
Purpose. This research paper focuses on the operational efficiency of Baltic pension fund management companies from the perspective of competitiveness of small and medium-size companies with no or low exposure to non-pension fund management business compared to other companies in the marketplace. The purpose is to assess whether small and medium-size pension fund management companies operating in Estonia, Latvia and Lithuania are capable of competitive efficiency compared to companies with bigger assets under management and a bigger share of non-pension fund management income.

Methods. The methods used in the empirical part of the research are: data envelopment analysis as well as main trend analysis, cluster analysis, development indicators, relative and absolute indicators. Data used for empirical research are from pension fund management companies in Latvia, Lithuania and Estonia. The research period covers the post-financial crisis years from 2009 to 2014.

Findings. The research outcome is reasoning why non-diversified small and medium-size pension fund management companies are capable of achieving competitive efficiency compared to their peers with bigger assets under management, which can be both non-diversified as well as more diversified companies.

Originality. In the context of a general lack of studies on the topic in the Baltic countries, the research paper provides a comprehensive quantitative assessment of the efficiency of pension fund management companies in the region with a focus on competitiveness of small and medium-size companies.

Keywords: Pension fund management, data envelopment analysis, efficiency.

INTRODUCTION
Stakeholder theory asserts that managers should make decisions that take into account the interests of all the firm’s stakeholders. This will include shareholders, employees, suppliers, customers, local communities, the government and the environment (Pike, Neale 2009). The pension fund management marketplace is a typical business example where the interests of shareholders, customers and the government (via regulators) have to be balanced. Both too low and too high operational efficiency can lead to market distortions, which will have a negative impact on sustainability in the long run. The research problem is to assess whether small and medium-size pension fund management companies operating in Estonia, Latvia and Lithuania are capable of generating competitive efficiency compared to companies with bigger assets under management and a bigger share of non-pension fund management income. The research hypothesis is that companies with such a profile are competitive despite possible lack of economies of scale and scope. Pension fund management companies domiciled in the Baltics are generally owned by international financial groups of Nordic origin, which puts the research in the context of efficiency and sustainable development of multinational companies. The methods used in the empirical part of the research to process the abovementioned data are mathematical programming, mainly DEA and main trend analysis, cluster analysis, development indicators, relative and absolute indicators and other methods.

Literature Review
The performance management problem has triggered a fair amount of scientific discussion. Typically, measurements based on an accounting, market, economic value added or balances scorecard are used for performance assessment purposes. Accounting and market-based performance indicators prevail in diversification research. Accounting performance measurements can also be used when non-listed firms
are included. However, their main drawback is looking backward as well as the risk that they can be subject to managerial manipulation. Bank efficiency studies are considered to be fairly abundant by now (Deutsche Bundesbank 2006). But only a few apply two or more techniques to an identical data set, especially European data (Weill 2004). Studies that compare parametric and non-parametric techniques include Ferrier and Lovell (1990), Sheldon (1994), Resti (1997), Bauer et al. (1998), Casu and Girardone (2002) and Beccalli et al. (2006). An early study that compares alternative frontier techniques is Ferrier and Lovell (1990). The researchers analysed the cost structure of 575 US banks for the year 1984 using both the Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA) methodologies. They find higher efficiency scores with DEA compared to SFA, namely 80% and 74% respectively. They conclude that DEA is sufficiently flexible to envelop the data more closely than the translog cost frontier. However, efficiency scores are not significantly correlated, thus indicating that other factors not controlled for may drive the obtained wedge between the two measures. European evidence is provided by Sheldon (1994). He analysed the cost efficiency of Swiss banks with SFA and DEA in the period of 1987 to 1991. While results from DEA indicate that the average degree of cost efficiency is about 56%, SFA yielded only 3.9% mean efficiency. This substantial deviation from the usually obtained magnitudes of around 80%, obtained for US and European studies, casts some doubt as to an appropriate specification of the cost function (Amel et al. 2004). Likewise, he reports an insignificant rank-order correlation of 1%, indicating that no relationship exists between the two groups of efficiency scores. These results – that two alternative methods to implement an identical theoretical cost minimization problem should not be correlated – are remarkable. And, in fact, Resti (1997) provides very different results. He analysed the cost efficiency of 270 Italian banks over the period of 1988-1992. He compares the parametric and non-parametric efficiency scores and finds that the econometric and linear programming results do not differ substantially. Moreover, contrary to Ferrier and Lovell (1990) and Sheldon (1994), he reports higher efficiency scores between 81% and 92% for SFA as opposed to DEA scores between 60% and 78%. Rank correlation between SFA and DEA is statistically significant at the 1% level and ranges from 44% to 58%. The rank ordering of firm-specific inefficiency is strongly correlated over time, although it is more persistent with DEA than with SFA. The Bauer et al. (1998) study is the most significant of all, given the application of four approaches – SFA, DEA, Thick Frontier Analysis (TFA) and Distribution Free Analysis (DFA) – on a data set of 683 US banks over the period of 1977-1988. They suggest six consistency conditions to analyse the robustness of frontier efficiency measures. They compare the efficiency distributions, the rank order correlation of the efficiency distributions, the correspondence of best-practice and worst-practice banks across techniques, the stability of measured efficiency over time, the consistency of efficiency with market-competitive conditions and the consistency with standard non-frontier performance measures. For each approach, they calculate a measure of single-year efficiency and a measure of total-years efficiency based on one set of banks over the entire time period. Mean efficiency of parametric techniques averages 83% while mean efficiency for the nonparametric approaches is only around 30%. Nonparametric and parametric techniques present only a very weak consistency ranking with each other: rank-order correlation is 10%. All the methods are stable over time, although DEA generally shows slightly better stability than the parametric methods. On the other hand, the parametric efficiency scores are generally consistent with the standard performance measures, while DEA efficiency scores are much less so. In sum, Bauer et al. (1998) conclude that there is no single correct approach to specify an efficient frontier. Instead, both measures seem to react to varying degrees to particularities of the data. Thus, reporting methodological cross-checks is important to ensure that policymakers are aware of the different information contained in efficiency measures derived with alternative methods. In their study, Casu and Girardone (2002) evaluated the cost characteristics, profit efficiency and productivity change of Italian financial conglomerates during the 1990s using SFA, DFA and DEA. Efficiency measures from stochastic and deterministic frontiers are reasonably similar in magnitude and also show similar variation in efficiency levels. Despite these similarities in range and variance of the efficiency score, the trend in the DEA cost efficiency increases between 1996 and 1998 and shows a rather sharp decrease in 1999. In turn, SFA estimates exhibit a steady improvement in cost efficiency. Not surprisingly, DFA efficiency estimates are consistent with the DEA scores rather than with the SFA scores and display a decreasing trend of efficiency. Weill (2004) also checks the robustness of SFA, DFA and DEA. He measures the cost efficiency of 688 banks from five European countries (France, Italy, Germany, Spain, and Switzerland) over the period of 1992-1998. He compares mean efficiencies, correlation coefficients between
methodologies and the correlation with standard measures of performance. Efficiency scores do not differ substantially across techniques and are positively correlated between SFA and DFA. At the same time, there is no positive relationship between any parametric approach and DEA. All approaches provide efficiency scores that are correlated with standard measures of performance. Beccalli et al. (2006) measure the cost efficiency of stock-market-listed European banks in 1999 and 2000. They investigate the link between efficiency measures and the market performance of financial institutions by means of SFA and DEA and find that percentage changes in stock prices reflect percentage changes in cost efficiency, particularly those derived from DEA. Furthermore, SFA efficiency scores are slightly higher than DEA scores, namely 85% versus 83%, and DEA efficiency scores are more dispersed compared to SFA scores. In sum, more recent studies find that SFA efficiency scores are generally higher compared to DEA scores. This may reflect the different treatment of stochastic noise and the ability to control for heterogeneity. At the same time, studies that investigate the differences across methods more systematically show that efficiency measures differ not only in terms of mean industry efficiency. Because of the scope of and other limitations of this article, the authors employ DEA CRS and VRS models to assess operational efficiency. SFA is left out of the scope.

Theoretical Framework

Foundations of the Data Envelopment Analysis

The mathematical programming approach to construction of frontiers and measurement of efficiency relative to constructed frontiers goes by the descriptive title of data envelopment analysis, with the acronym DEA (Fried et al. 2008). It truly does envelop a data set; it makes no accommodation for noise, and so does not “nearly” envelop a data set the way the deterministic kernel of a stochastic frontier does. Moreover, subject to certain assumptions about the structure of production technology, it envelops the data as tightly as possible. Data Envelopment Analysis was first coined by Charnes, Cooper and Rhodes (1978) and had an input-oriented model with constant return to scale (CRS). This method, which is currently known as basic DEA, was an extension of “Farrell's measure to multiple – input multiple – output situations and operationalised it using mathematical programming” (Emrouznejad 2000). Recent scientific publications worldwide confirm that DEA is applied widely in different branches of scientific research (Liu et al. 2016). DEA has been applied for simultaneous analysis of production and investment performance of Canadian life and health insurance companies (Wu et al. 2007), for analysis of efficiency and productivity in the Swiss insurance industry (Biener et al. 2016), on bank branch efficiency (Paradi et al. 2011), and on efficiency evaluation of equity funds (Babalos et al. 2012). It is widely used for rankings (Adler et al. 2002), for research evaluation (Meng et al. 2008), and on requirements and challenges for application of DEA (Hatami-Marbini et al. 2011).

So as to illustrate the basic DEA model mathematically, let’s assume that all the decision-making units (DMUs) use m inputs for the production of n outputs in a given technology level. denotes the amount of input i (i=1,2,….,m) produced by j th DMU (j=1,2,….,k), whereas represents the quantity of output s (s=1,2,…..,n) produced by j th DMU (j=1,2,….,k). The variables (r=1, 2,….,n) and (i=1,2,……,m) are weights of each output and input respectively. The technical efficiency of can be written as:

$$\begin{align*}
\text{Max} & \sum_{r=1}^{n} u_r Y_{r0} \\
\text{subject to:} & \sum_{i=1}^{m} w_i X_{i0} \leq 1 \\
& \sum_{r=1}^{n} u_r Y_{rj} \leq 1 \\
& \sum_{i=1}^{m} w_i X_{ij} = 1
\end{align*}$$

for j=1,2,….,k, whereas $u_r$ and $w_i \geq 0$ (r=1,2,……,n) and (i=1,2,……,m). This mathematical representation can be clarified as finding the appropriate values for $u$ and $w$ that maximise the efficiency level of the observed firm subject to all efficiency scores being less than or equal to 1. To avoid infinite solutions (Coelli et al. 2005) and obtain a linear programming model, the Charnes-Cooper transformation can be used as follows:

$$\begin{align*}
\text{Max} & \sum_{r=1}^{n} \mu_r Y_{r0} \\
\text{subject to:} & \sum_{i=1}^{m} w_i X_{i0} = 1
\end{align*}$$
and

\[(\sum_{r=1}^{n} \mu_r Y_{rj} - \sum_{i=1}^{m} w_i X_{ij}) \leq 0\]

whereas \(\mu\) and \(w\) \(i \geq 0\) (\(r=1,2,\ldots,n\)) and (\(i=1,2,\ldots,m\)). As a result of these linear programming iterations, the efficiency level of the observed DMU – DMU_0 in this case – is equal to 100% if and only if:

\[\text{i. } = 1\]
\[\text{ii. } = 0 \text{ for all } (i=1,2,\ldots,m) \text{ and } (r=1,2,\ldots,n).\]

If we return to the debate between Farell and Koopmans, proposition (i) is a necessary condition for Farell for efficiency; however, Koopmans states that full efficiency necessitates both (i) and (ii). Figure 1 illustrates DEA in a very generic representation, which allows for a straightforward discussion of Farell and Koopmans’s efficiency approaches. For Farell, all the points on the isocost curve can be considered as efficient combinations of input-1 and input-2. However, Koopmans reveals the fact that points on the isocost curve with slack usage of inputs (like A, F, I) can’t be shown as an efficient combination of inputs.

Figure 1: General representation of DEA
Source: Erkoc (2012)

DEA CRS and VRS Models
The analysis up to this point has assumed that DMUs operate at constant return to scale (CRS), as put forward by Charnes, Cooper and Rhodes (1978), where \(t\) times increase in inputs will result in \(t\) times increase in output:

\[tY = tf(x)\]

On the other hand, in many sectors, due to “imperfect competition, government regulations and constraints on finance”, firms can’t be run at optimal scale (Coelli et al. 2005). Therefore, scale efficiency, which has an impact on the technical efficiency of a firm, arises in these circumstances. So as to capture the magnitude of “scale effect”, Färe, Grosskopf and Logan (1983) and Banker, Charnes and Cooper (1984) developed a variable returns to scale (VRS) in which CRS assumption is relaxed. Figure 2 illustrates the divergence of VRS models from CRS models in a quite generic way. For instance, the efficiency of point B is calculated as the ratio of \(O_1/O_2\) regarding the VRS frontier, whereas is equal to \(O_1/O_3\) if the CRS frontier is taken as the reference point. Eventually, it is apparent that the VRS frontier takes the magnitude of scale efficiency into account while measuring the total efficiency.
The linear programming model of VRS is quite similar to the CRS model as indicated in the previously discussed formulas. The only difference is the addition of a convexity constraint to the system:

$$\sum_{j=1}^{k} \lambda_j = 1, \text{for } j = 1,2,\ldots,k$$

for j= 1, for j=1,2,…..k.

The mathematical relationship between VRS and CRS efficiency measurements can be illustrated as (Coelli et al. 2005):

$$TE_{CRS} = TE_{VRS} \times SE$$

where SE denotes scale efficiency, which means that the CRS technical efficiency of a firm can be decoupled into pure technical efficiency and scale efficiency (SE). Even though an analytical association exists among CRS and VRS models, input and output efficiency scores are different in VRS models unlike in CRS models (Emrouznejad 2000).

**Analysis and Result Discussion**

The pivotal role in the Baltic banking and, as a result, pension fund marketplace belongs to players of Nordic origin, while local companies with mixed shareholding structures provide some diversification to the market, even though not all major Nordic market players are present in the Baltic countries. In particular, when the market share is based on total assets, the two largest banks in Denmark – Danske Bank and Nordea – manage 67% of the total market (European Banking Federation 2012). Swedish commercial banks are divided into three categories. Universal banks: banks that are represented in a large part of the financial market and offer all kinds of financial services are categorised as universal banks. Among the Swedish universal banks, we find the ‘big four’ banks: Nordea, Swedbank, Svenska Handelsbanken and SEB. Together they have a strong position on the Swedish market, although the market shares vary in different niche markets. There is also DNB, domiciled in Norway, which is also represented in each Baltic country. The Baltic marketplace is mainly occupied by such Nordic financial groups as Swedbank, SEB, Nordea, DNB and to some extent Danske Bank. The Baltic countries in the given research are defined as Estonia, Latvia and Lithuania, and certain local market players are also present in these countries. Twenty pension fund management companies are included in the research and are listed in Table 1 (the last two capital letters stand for Estonia in the case of EE, Latvia in the case of LV and Lithuania in the case of LT).

The cluster analysis is performed by using the single linkage method (Lee 2015). Clusters which constitute a special scientific interest are numbers one, two and four. The first cluster represents small to medium-size pension fund management companies (i.e. assets do not exceed EUR 400 mio) with a low to non-existent share of non-pension fund management income (i.e. typically 0-15%). The second one is comprised of big companies (i.e. assets range from EUR 400-930 mio) with low to non-existent...
non-pension fund management income (i.e. up to 9%). Number four is comprised of big companies (i.e. assets range from EUR 500-950 mio) with moderate exposure to non-pension fund business (i.e. 14-34%).

Table 1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Companies</td>
<td>Danske Capital LT, Nordea LV, MP Pension Funds Baltic LT, DNB LV, Nordea EE, Danske Capital EE, DNB Nord LT, Finasta LV</td>
<td>DNB LV, LHV EE, Danske Capital EE, DNB LT, Finasta LV, Nordea LV, Nordea EE, MP Funds LT, Ergo Funds EE, Danske Capital LT</td>
<td>DNB LV, LHV EE, Norvik LV, Danske Capital EE, DNB LT, Finasta LV, Nordea LV, Nordea EE, MP Funds LT, Ergo Funds EE, Danske Capital LT</td>
<td>DNB LV, LHV EE, Norvik LV, Danske Capital EE, DNB LT, Finasta LV, Nordea LV, Nordea EE, MP Funds LT, Ergo Funds EE, Danske Capital LT</td>
<td>DNB LV, LHV EE, Norvik LV, Danske Capital EE, DNB LT, Finasta LV, Nordea LV, Nordea EE, MP Funds LT, Ergo Funds EE, Danske Capital LT</td>
<td>Norvik LV, Finasta LV, Ergo LV, Nordea EE, Danske Capital LT, MP Pension Funds Baltic LT, Danske Capital EE, Nordea EE, DNB LV, LHV EE, DNB Nord LT</td>
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<td></td>
<td>AuM range, millions of euros</td>
<td>45-323</td>
<td>43-374</td>
<td>39-252</td>
<td>31-219</td>
<td>8-143</td>
<td>6-97</td>
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<td></td>
<td>Non-pension share range</td>
<td>0-9%</td>
<td>0-11%</td>
<td>0-14%</td>
<td>0-23%</td>
<td>0-36%</td>
<td>0-18%</td>
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<td>2.</td>
<td>Companies</td>
<td>Swedbank LV, SEB LV, Swedbank LT</td>
<td>Swedbank LV, Swedbank LT</td>
<td>Swedbank LV, Swedbank LT</td>
<td>Swedbank LV, Swedbank LT</td>
<td>Swedbank LV, Swedbank LT</td>
<td>Swedbank LV, Swedbank LT</td>
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<td></td>
<td>AuM range, millions of euros</td>
<td>653-930</td>
<td>548-737</td>
<td>524-628</td>
<td>445-512</td>
<td>426-497</td>
<td>379-411</td>
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<td></td>
<td>Non-pension share range</td>
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<td>1-2%</td>
<td>0-2%</td>
<td>0-3%</td>
<td>1-4%</td>
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<td></td>
<td>AuM range, millions of euros</td>
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<td>-</td>
<td>114-166</td>
<td>92-368</td>
<td>104-435</td>
<td>235-441</td>
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<tr>
<td></td>
<td>Non-pension share range</td>
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<td>-</td>
<td>50-55%</td>
<td>51-55%</td>
<td>25-55%</td>
<td>44-61%</td>
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### 4. Companies

<table>
<thead>
<tr>
<th></th>
<th>CBL LV, LHV EE</th>
<th>SEB LV, SEB LT</th>
<th>SEB LV, SEB LT</th>
<th>SEB LV, SEB LT</th>
<th>SEB LV, Swedbank EE, SEB LT</th>
<th>SEB LV, SEB LT</th>
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<tr>
<td>AuM range, millions of euros</td>
<td>504-594</td>
<td>770-780</td>
<td>524-754</td>
<td>616-633</td>
<td>608-953</td>
<td>556-580</td>
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<tr>
<td>Non-pension share range</td>
<td>15-22%</td>
<td>14-18%</td>
<td>15-16%</td>
<td>17-24%</td>
<td>20-34%</td>
<td>17-19%</td>
</tr>
</tbody>
</table>

|                  | Norvik LV, Ergo EE | - | - | - | - | - |

<table>
<thead>
<tr>
<th></th>
<th>SEB EE, Finasta LT, Swedbank EE</th>
<th>SEB EE, CBL LV, Swedbank EE, SEB EE, Finasta LT</th>
<th>Norvik LV, CBL LV, Swedbank EE, SEB EE</th>
<th>Swedbank EE, SEB EE</th>
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<th>Swedbank EE, Finasta LT</th>
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<tr>
<td>AuM range, millions of euros</td>
<td>65-250</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Non-pension share range</td>
<td>19-22%</td>
<td>-</td>
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</tbody>
</table>

**Outliers**

<table>
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<tr>
<th></th>
<th>139-1100</th>
<th>124-1,284</th>
<th>155-1,473</th>
<th>846-1,300</th>
<th>1,980</th>
<th>52-882</th>
</tr>
</thead>
<tbody>
<tr>
<td>AuM range, millions of euros</td>
<td>19-40%</td>
<td>27-55%</td>
<td>29-43%</td>
<td>34-47%</td>
<td>47%</td>
<td>31-46%</td>
</tr>
</tbody>
</table>

Source: authors’ calculations based on company data.

Companies classified as outliers will occasionally appear in the top quartile of the most efficient companies, which will be demonstrated by the analysis below.

### Cost and Capital Efficiency DEA CRS and VRS Models

Cost and capital efficiency DEA CRS and VRS models are implemented in the following sections. The models can be viewed as consisting of two cost types: actual costs and implied capital costs. The actual cost part of the models comprises administration and commission costs as input variables. The capital cost part of the models, which is also an input variable, comprises implied cost of capital defined as a required pre-tax return on equity, which is multiplied by average equity in a specific year. Three scenarios are used for calculating the implied cost of capital: pre-tax ROE of 11%, 15% and 19%. The choice of these figures is based on analysis of ROE developments in the banking and asset management field. The output variable of the models is commission fees generated in a specific year. Therefore, the whole cost and capital efficiency model has three input variables (i.e. costs) and one output variable (revenue). The model has three scenarios depending on the pre-tax ROE discussed above. The results for Hipo Funds LV, which sold its pension fund management operations to SEB LV in 2012, are not included in the results for 2014 and 2013. Therefore, there are 118 observations in total, which are made up of 20 companies for the period of 2009 -2014 except the results for Hipo Funds in 2014 and 2013.

### The DEA CRS Model – General Results

A regression analysis was run to examine whether bigger assets under management and a bigger share of non-pension fund income increase the cost and capital efficiency of pension fund management...
companies. Because the dependent variable cost efficiency is expressed in a range from 0 to 1 and share of non-pension fund management revenue is also expressed in a range from 0 to 1 while assets under management are expressed in millions of euro, assets under management figures were normalised for each year of the research by using the following formula:

\[ x_{\text{Norm}} = \frac{(X - x_{\text{Min}})}{(x_{\text{Max}} - x_{\text{Min}})} \]

where \( X \) stands for actual variable, \( x_{\text{Min}} \) is the least variable, \( x_{\text{Max}} \) is the largest variable and \( x_{\text{Norm}} \) is a normalized variable.

The regression equation is expressed in the following manner:

\[ CE = \beta_1 \times \text{NormAuM} + \beta_2 \times \text{ShareNonPensInc} + \alpha \]

where CE is cost efficiency score, NormAuM is a figure of normalised assets under management obtained by using the formula stated above, ShareNonPensInc is a share of non-pension fund revenue and \( \alpha \) stands for intercept.

The regression analysis for all three pre-tax return on equity scenarios proved that there is no correlation between efficiency score and assets under management and share of non-pension fund management revenue. Table 5 summarises the main findings of the regression analysis run for three scenarios of pre-tax return on equity.

### Table 2

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>11%</th>
<th>15%</th>
<th>19%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Adjusted R-squared</td>
<td>0.03</td>
<td>0.03</td>
<td>0.05</td>
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<tr>
<td>2.</td>
<td>Significance F</td>
<td>0.06</td>
<td>0.05</td>
<td>0.02</td>
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<tr>
<td>3.</td>
<td>Observations</td>
<td>118</td>
<td>118</td>
<td>118</td>
</tr>
</tbody>
</table>

*Source: authors’ calculations based on company data.*

Very low values of adjusted coefficients of determination (referred to as R-squared in Table 5) clearly demonstrate that there is no empirical evidence that pension fund management companies with bigger assets under management and a bigger share of non-pension fund management revenue tend to be more efficient than the average company on the market. The findings of the regression analysis are considered to be significant because significance figures range from 0.02 to 0.06.

**The DEA CRS model – cluster efficiencies**

The goal of this section is to assess the efficiency of each cluster in different pre-tax ROE scenarios with a particular focus on the first cluster of small to medium-size non-diversified pension fund management companies and big non-diversified as well as moderately diversified pension fund management companies. Efficiency ranks are calculated for the three pre-tax return on equity scenarios described in the section above. The first cluster of small to medium-size non-diversified pension fund management companies comprises the greatest scientific interest. In particular, the efficiency of companies belonging to this cluster is pivotal for the paper. The cluster is the biggest one in terms of the number of its members, even though this figure tends to decrease from eleven in 2009 to just eight in 2014. To begin with, the capital-light (pre-tax ROE=11%) scenario is considered first (see Figure 3). With the exception of 2010 and 2011, where the cluster hosts only two top quartile performers, typically three out of five top quartile performers are found in this cluster. This is very strong evidence that the cluster hosts competitive companies from the top quartile.
The next scenario, which assumes ROE of 15%, reveals nearly the same findings (see Figure 4). In particular, clusters one and four are the most often represented in the top quartile of efficiency ranks, even though cluster one is represented by three companies only in two years while in the previous scenario three companies of the cluster were included in the top quartile four times. Another obvious difference compared to the previous ROE scenario is that cluster number two appears four times as opposed to two appearances in the capital-light scenario. Given the fact that cluster two represents a big pension fund management company with low to non-existent exposure to non-pension fund management business, this finding is considered to be valuable from the perspective of the efficiency analysis of small to medium-size pension fund companies compared to big pension fund management companies.

Cluster number three appears only once; thus, it can be disregarded. Other clusters, including outliers, do not appear in the scenario of ROE equal to 15% at all. Finally, the most capital-intensive scenario, which assumes ROE of 19%, is examined. The most apparent finding is that the first cluster is not represented in 2009 at all. However, it is represented in all other years, typically nominating two of its companies for the top quartile members. The fourth cluster of companies is represented in each single year and most often these are two companies of the cluster, except 2014. It should be noted that the fourth cluster primarily consists of two companies, except for 2010, when it had three members. Thus, such a result should be considered very strong from a probabilistic perspective.
Cluster number two is represented four times, which is very similar to the previous scenario. However, it should be noted that in 2014, two companies which originally constituted cluster number four joined cluster number two and contributed to the high efficiency figures of the cluster. Cluster number three occupied a place in the top quartile twice out of six years of observation, which is still not sufficient to make any positive conclusions about the efficiency of companies in the cluster.

To summarize the efficiency result discussion, members of cluster one demonstrated top efficiency in all three scenarios of return on equity because the cluster was included in the top quartile of efficiency rankings in any single year except 2009, which was precisely the so-called bottom of the financial crisis. The members of cluster number four clearly enjoy the probabilistic advantage of being included in the top quartile of the efficiency ranking. These are big pension fund management companies with low to moderate exposure to non-pension fund management business. It is noteworthy that more intensive capital scenarios led to more frequent appearances of the big pension fund management companies with non-existent to low non-pension fund management revenue, represented by cluster number two, in the top quartile of the efficiency ranking. The same observation, to a lesser extent, is valid for the abovementioned cluster number two. Therefore, this section provided evidence that more intensive capital scenarios increase the relative efficiency of big pension fund management companies with both non-existent to low and low to moderate non-pension fund management income. Moreover, such companies also enjoy the probabilistic advantage of occupying the top quartile of the efficiency ranking compared to small to medium-size pension fund management companies with non-existent to low non-pension fund management income. Big companies with low to moderate non-pension fund management income tend to outperform those with non-existent to low non-pension fund management income, however.

The DEA VRS Model – General Results
A regression analysis was run in the same way as in the DEA CRS section of the article to examine whether bigger assets under management and a bigger share of non-pension fund income increase the cost and capital efficiency of pension fund management companies. The regression analysis for all three pre-tax return on equity scenarios proved that there is a weak correlation between efficiency score and assets under management and share of non-pension fund income increase the cost and capital efficiency of pension fund management companies. Table 6 summarises the main findings of the regression analysis run for three scenarios of pre-tax return on equity.

<table>
<thead>
<tr>
<th>No.</th>
<th>Parameter</th>
<th>11%</th>
<th>15%</th>
<th>19%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Adjusted R-squared</td>
<td>0.1956</td>
<td>0.1718</td>
<td>0.1496</td>
</tr>
<tr>
<td>2.</td>
<td>Significance F</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3.</td>
<td>Observations</td>
<td>118</td>
<td>118</td>
<td>118</td>
</tr>
</tbody>
</table>

Source: authors’ calculations based on company data.
Even though the values of adjusted coefficients of determination (referred to as R-squared in the table) are higher than those obtained for the DEA CRS model, they are still considered to be too low to provide empirical evidence that pension fund management companies with bigger assets under management and a bigger share of non-pension fund management revenue tend to be more efficient than the average company on the market. The regression equation is significant provided that substantial significance values do not exceed 0.00003.

The DEA VRS model – Cluster Efficiencies

The DEA VRS model findings are assessed through the cluster perspective in this section of the paper. The most attention is paid to the 1st cluster of the small to medium-size pension fund management companies with non-existent to low exposure to non-pension fund management revenue. The top quartile efficiency ranks are presented in Figure 6.

The findings suggest that companies from cluster number one are the most often represented in the top quartile given the capital-light scenario (i.e. ROE=11%). In particular, there are typically two to three companies originating from the given cluster out of five to six companies in the top quartile. Consistently, cluster number four is a permanent resident of the top quartile, also being represented in any single year. Consistently with findings from the previous section of the paper, given the small number of companies forming cluster number four, there is a clear probabilistic advantage for the cluster members to get into the top quartile. The appearance of cluster two, which is supposed to host big companies with non-existent to low exposure to non-pension fund management business, is also quite consistent with the findings of the previous section. However, the DEA VRS model reveals valuable findings in relation to the so-called outliers. Quite unexpectedly companies classified as outliers appear in any single year except 2010. Certainly, it is worth mentioning that the variable return to scale model can mean increasing, decreasing or a combination of increasing and decreasing returns to scale. Given the clear contrast to the DEA CRS model, inclusion of outliers as well as more frequent appearances of big pension fund management companies in the top efficiency quartile in accordance with the DEA VRS model speaks in favour of decreasing returns to scale.

The scenario with average capital intensity, assuming pre-tax return on equity of 15% per annum, demonstrates fairly similar findings as the capital-light scenario described above. The findings are shown in Figure 7.
Typically, almost half of top quartile companies have a first cluster origin while the rest are distributed among the fourth cluster, second cluster and outliers.

The capital-intensive scenario, which assumes ROE of 19%, clearly ensures a more favourable environment for the second cluster of pension fund management companies (i.e. big companies with non-existent to low non-pension fund management income), while the conditions for outliers and companies belonging to cluster number four are nearly the same as for the two capital scenarios described above (see Figure 8). Logically, the second cluster companies are benefiting at the expense of the first cluster companies, which is clearly represented less often in this scenario of capital intensity – typically not more than two companies out of five.

To summarize the efficiency result discussion, members of cluster one demonstrated top efficiency in all three scenarios of return on equity because the cluster was included in the top quartile of efficiency rankings in any single year. However, this cluster was closely followed by cluster number four and outliers as well as occasionally by cluster number two companies. It is noteworthy that more intensive capital scenarios increase the relative efficiency of big pension fund management companies with both non-existent to low and low to moderate non-pension fund management income. Moreover, such companies also enjoy the probabilistic advantage of occupying the top quartile of the efficiency ranking compared to small to medium-size pension fund management companies with non-existent to low non-pension fund management income. Big companies with low to moderate non-pension fund management income are represented less often than those with non-existent to low non-pension fund management income, however.
CONCLUSIONS
The regression analysis revealed that pension fund management companies with bigger assets under management and a bigger share of non-pension fund management income do not demonstrate higher operational efficiency ratings. The findings of the DEA CRS analysis from the cluster perspective demonstrated that the top quartile of clusters consists of small to medium-size pension fund management companies with a non-existent to low share of non-pension fund management income and big companies with non-existent to low non-pension fund management income as well as those with moderate exposure to non-pension fund business. The DEA VRS analysis revealed a similar pattern with one key distinction in relation to outliers which managed to earn their place in the top quartile. In particular, outliers penetrated the top quartile mostly at the expense of the big pension fund management companies with moderate exposure to non-pension fund management business, which might have increased the correlation between efficiency ratings and assets under management and share of non-pension fund income. Thus, evidence has been obtained that small and medium-size pension fund management companies are capable of achieving competitive efficiency compared to their peers with bigger assets under management, which may be non-diversified or more diversified companies.

Management of small and medium-size companies should pursue efficiency improvements, if needed, by benchmarking against top performers within their own cluster. Empirical evidence suggests that pursuing much bigger assets under management (i.e. typical for other clusters) and/or greater business diversification to non-pension fund management activities will not necessarily improve the efficiency of such companies because no general correlation has been found between efficiency and assets under management and share of non-pension fund management income. The strategy of pursuing much greater diversification to non-pension fund management income resulted in inefficiency (i.e. outliers typically have great exposure to non-pension fund management business) rather than efficiency improvement. The DEA VRS findings might challenge the latter statement and thus it might need further investigation.

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DEVELOPMENT OF LATVIAN PENSION SYSTEM IN CHANGING ECONOMIC ENVIRONMENT

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Abstract
Latvia, like any European country, is facing challenges in pension system organization due to the population age structure. In the 1990s, during the reform of the social sector, Latvia introduced a three-level pension system aimed at reducing the effect of demographic risks and demonstrating the country’s intention to provide a viable public and private combination in old-age provision. The potential impact of demographic change on the age structure and size of the population is dramatic and the main problem is the ability of pension schemes to provide retirement incomes which fully correspond with previous employment income without reducing quality of life. Thus, personal investments in retirement income schemes are also important.
The aim of this research is to investigate what the possible solutions are for developing the existing pension system in Latvia and incentives for personal investment to ensure provision of an appropriate retirement income level.
The paper addresses the efficiency of the Latvian private pension system. The current situation is described, the efficiency of private voluntary pension schemes is estimated taking into account the Latvian demographical situation with a flow of emigration, and the impact of existing tax incentives for employees is analysed.
Qualitative methods (statistical data analysis, forecasting and other financial calculations) are used for theoretical comparison and analysis of pension systems. Interviews with experts and personal observations are used to reveal the problems in the current pension system of Latvia.
Recommendations for possible incentives for development of private pension investments are made. Also, conclusions on possible development directions are drawn.
Keywords: pension system, private voluntary pension scheme, solidarity principle, full-fledged social security, taxation of pensions
Research paper

1. INTRODUCTION
Modern economic development trends require a change of views on the sustainability of pension systems and the prospect of their future development directions. Changes in the economic environment and the impact of the demographical structure of the population lead to changes in how pension systems function. Technological progress and an increase in quality of life also cause life expectancy to increase, and changes in the relationship between the number of employees and the number of recipients of old age pensions will occur. Productivity in the sector of the “real economy” will rise and that will cause economic structural changes and changes in labour demand. The Latvian pension system has always
been an object of research since it was established after the reform in the 1990s. Initially, the aim of the pension system reform was to restructure the existing pension system according to the present social-economic system in Latvia to meet the requirements of the market economy and, consequently, it was not able to function in the new situation. Three pension levels have been introduced in the country. In analysing the social security system some authors (Kozlovsksis and Bistrova, 2015) concentrate on the first (state pension) and second (state-funded pension) levels. Others, such as Rajevska (2013), analyse comparative aspects of funded pension schemes. This paper addresses the efficiency of the Latvian pension system focusing on the third (voluntary private pension) system.

2. PENSION SYSTEM DEFINITION AND THE LATVIAN PENSION SYSTEM

In creating a social policy system, it is essential to meet the present generation’s social and economic needs without compromising future generations. Without such an approach, sustainable development of society cannot take place and quality of life would decrease. The main assumptions for social policy are budgetary constraints (fiscal policy requirements), protection of taxpayer rights and interests (tax policy requirements) and social protection and poverty reduction requirements. A serious challenge is the aging population, which is of increasing concern. The main question is whether society will be able to provide a dignified existence and an active social life at retirement age. Currently pension systems are a subject of lively debate among professionals and society. The previous pension system in Latvia did not meet the needs of the market economy and consequently, it was not able to function in the market economy conditions and current demographic situation. According to previous system reform, the size of the pension did not depend on the amount of payment made; rather, the amount of the pension depended on average salary and length of service. Such a situation did not stimulate employees to make tax payments because the pension was ensured even in cases when tax payments were made according to the minimum wage set by the country’s legislation. Thus, risks regarding pension system sustainability in the future were present. The main task was to set up a financially sustainable system to reduce the risks involved with a rapidly aging population. (Mavlutova & Titova, 2014)

The word pension derives from the mediaeval English term pension (payment), which in turn derives from pensio, pension, pensus, pendere (consideration, to consider, payment, to pay) in Latin. The following definition of the term pension is found in the Britannica Concise Encyclopaedia: “a pension is a regular payment to a person retired from work in case of disablement due to age, physical disability or expiration of fixed term service” (Britannica Concise Encyclopaedia, 2006). The payment period usually continues till the end of the natural life of the retiree, and sometimes the payments are extended and assigned to the widows/widowers of the retirees after their death. The Oxford Dictionary (2012) explains the term “pension” as a regular payment made to retired persons (or older) or to physically handicapped persons, or to widows. The Statistical Bureau of European Communities defines the term “pension” as periodical payments with the aim of maintaining the receiver’s income after retirement when paid employment at the normal pension age ceases or to back the income of elderly people (European Parliament's Employment and Social Affairs, 2010). The Organization for Economic Cooperation and Development (2003) defines pensions as payments made to the participants of the pension fund (or to the dependent person) after retirement age.

The following definition of old-age pension was suggested in Latvia: an old-age pension is a constant and regular income for members of society approaching an age determined within laws and regulations which provides social funding of full value in the long term in accordance with the length of service and social insurance payments made in advance (Volskis, 2011). The authors agree with Holzmann et al. (2008) and Rajevska (2016) that a successful pension system is an equitable system, one that provides income redistribution from the lifetime rich to the lifetime poor consistent with societal preferences in a way that does not tax the rest of society external to the system, and one that provides the same benefit for the same contribution.

In evaluating the explanations above, the authors believe that a pension is a periodical benefit (payment) with the aim of maintaining income after retirement or ensuring that, at the age and physical state determined within laws and regulations, persons incapable of working receive the incomes necessary to maintain minimum living standards.

There are three main objectives lying at the basis of an old-age pension system:

- The principle of solidarity;
- The principle of justice;
• The voluntarily principle.

Globally there are four main drivers of pension reforms:
2. Availability – providing for those who are unable to invest in and maintain a sufficient level, for several decades after retirement
3. Substitutability – standard of living comparable to the one maintained during working years.
4. Labour force participation – must pay interest, so as not to tend toward retiring earlier and avoiding payment of pensions.

The existing pension system is organized so that residents can participate in providing for their own old age. The core principal of the pension system is the following: the higher the social insurance instalments deposited at the present moment, the higher the pension received in the future.

Figure 1. The Structure of the Latvian Pension System

Source: compiled by the authors

The aim of the state-implemented pension reform is to create a financially stable and efficient pension scheme that is based on individual social security contributions which in turn will ensure an amount of pension that depends on the contributions made over the previous period and that will facilitate social security contribution growth.

The reform envisages the introduction of a three-level pension system as shown in Figure 1, thus improving the financial position of elderly people and division of risk between the state (future taxpayers) and a person’s savings in compulsory and voluntary pension schemes.

With regard to financing, two different kinds of pension system should be mentioned:
• Defined Benefit (DB) – a pension system which guarantees pension payments of a definite volume, not taking into account mandatory or voluntary social insurance contributions.
• Defined Contribution (DC) – a pension system at the basis of which lie pension contributions directly dependent on the mandatory or voluntary social insurance contributions paid into personal pension accounts.

The principles of these two pension systems (DB and DC) are implemented in the Latvian pension
system. Based on the justice principle, pension contributions in Latvia are directly dependent not only on mandatory and voluntary social insurance contributions, but also on the length of service and on the profitability level of the chosen funded pension plan. Alongside mandatory social insurance contributions, every person has the possibility to enlarge his/her personal pension fund by paying a voluntary contribution into private pension funds.

Pension Level 1 was introduced in 1996. It includes principles of equal treatment regardless of generation and gender. According to the European Pay–as-you-go System (PAYG), it is a type of pension which is subjected to huge demographical risks. PAYG envisages current retirees being paid from the contributions of today’s working population. It is believed that such a system reduces the savings amount, because the working population is not interested in making additional savings (Bode, 2003).

The main drawback of this system is its changeable ratio between the working population and retirees. As the number of working people decreases and the number of retirees increases, the tax revenue might not be sufficient to pay pensions. According to research carried out by Deutsche Bank and AEGON Global, the envisaged reforms were meant to reduce this risk. Such reforms were carried out in the United States and Western Europe; further, they were introduced in Central Europe as well as Eastern Europe (Life in European Union, 2012). The reforms are being introduced in Asian countries as well.

According to the existing legislation in Latvia, a specific pre-pension and pension age has been determined in order to provide pensions based on age. Raising the pension age has been one of the tools implemented to reduce the problem of aging. As of January 2014, when the existing pension age was 62 years, 3 months have been added per year; thus, by January 2025 the pension age will be 65 years. So, starting from January 2025 a person will receive an old-age pension if his/her insurance standing is of at least 20 years. (Law On State Pension, 1996). The Law on the State Pension also describes specific cases where a person has the right to receive an old-age pension prematurely; it is possible 2 years in advance of the legal pension age.

Pension Level 3, that is, a private voluntary pension scheme, was introduced in 1998. Pension Level 3 envisages a free choice for every individual to set up additional accruals for their pension by making contributions into private pension funds. (Law On Private Pension Funds, 1998)

Pension Level 2 was introduced in 2001. Since that period, a part of social security contributions that have been made have been invested in financial markets and pension accruals have been made in each Pension Level 2 personal account.

Taking into account the information above, the main success of pension system reform in Latvia is creating Pension Level 2, which is compulsory for the majority of the population; it also helps to reduce the effect of demographic risk on pension. However, this pension level is subjected to many other risks, which the population of Latvia must take into account when deciding on the appropriate pension fund. (Law On State Pension, 1996)

In accordance with The Law on the State-funded Pension (2001), each individual has the right to choose how to organize the payment of his/her funded pension capital. The need for the pension reform was the result of a steadily increasing aging population, which has made it difficult to keep the current retirement age. Life expectancy has been increasing gradually. As a result, every year we see a growth in costs for pensions from the social security budget.

The task of the pension system is to increase the compensation level under the condition that the person takes part in all three pension levels at the same time. Additional **accruals** to their pensions are formed in Pension Level 2 from their personal savings registered in pension capital which in turn is invested in stocks, bonds and other securities as well as bank deposits. Investment is carried out by an intermediary – a licensed wealth manager. Thus, pension capital accrues much faster than inflation and the average salary in the country. (State Social Insurance Agency, 2015). Nowadays Pension Level 2 participants can choose their own wealth manager, either state or private, and change investment plans twice a year. The authors agree with Garon, J. D. (2016) and Diamond (1994) that publicly managed pension plans are subject to political risks. Even benevolent governments may be tempted to engage in excess redistribution among retirees using pension wealth. Because of this, some have argued that funding and privatizing public pensions could reduce political risks.

From 2009 to 2013, pension contributions were transferred to Pension Level 1 in the amount of 18%, while contributions made to Level 2 were just 2%. At present, Pension Level 1 will receive 14% of
social contributions, while Level 2 will receive 6%. Such an allocation change, made in 2009, was not conducive to confidence in the pension system (State pension special budget, 2016).

Initially the aim of Pension Level 2 was not only to increase pension capital, ensuring full-value pensions in the future, but to facilitate the development of the national economy. There are seven private pension funds in Latvia now, which offer 20 different pension plans an individual can invest in.

Investment has been carried out according to two strategies:

- Active pension plans – the strategy of investing entities. A large part of assets is invested into shares and other securities. Such pension plans were chosen by 54.52% of representatives;
- Integrated pension plans envisage the investment of assets into secure state, local authority and commercial association securities and term deposits of credit institutions, which ensures stability of income. Such pension plans were chosen by 45.48% of individuals.

In 2015 the contributions of pension plan representatives reached 12.7 mln EUR. The average private pension capital yield of one individual rose by 6% or by 67 EUR and has reached 1262 EUR. The average age of the individuals was 46 years. (The Association of Commercial Banks of Latvia, 2015)

Currently the money is invested in short-term deposit savings where its profitability is much lower than inflation, so the money loses its value. Bonds accumulate money for the state budget which goes to consumption but not into state investments in the long term. Part of the money is invested in shares or other securities. Generally, the profitability of private pension plans is quite attractive (see Table 1).

Table 1

<table>
<thead>
<tr>
<th>Plans</th>
<th>1 year</th>
<th>3 years</th>
<th>5 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced pension plans</td>
<td>4.91%</td>
<td>5.32%</td>
<td>4.40%</td>
<td>4.19%</td>
</tr>
<tr>
<td>Active pension plans</td>
<td>6.62%</td>
<td>7.33%</td>
<td>4.97%</td>
<td>3.40%</td>
</tr>
<tr>
<td>Average profitability of all pension plans</td>
<td>5.33%</td>
<td>6.00%</td>
<td>4.83%</td>
<td>4.04%</td>
</tr>
</tbody>
</table>

Source: The Association of Commercial Banks of Latvia, 2015

The growing importance of participation in Pension Level 3 schemes is the main reason why the authors chose to analyse Pension Level 3 funds in Latvia. The money that the individual regularly pays into the fund is invested in various financial instruments depending on the chosen investment strategy. The aim of private funds is not only to save the money for retirement but also to gain additional value. The state grants various tax incentives for both companies where employee contributions are made in favour of Pension Level 3 funds and individuals who are themselves engaged in such contributions. Pension Level 3 contributions to the pension fund which do not exceed 10% of gross salary are not subject to income tax.

In private pension schemes participants with private pension funds accumulate and invest in their own voluntarily made cash contributions, thus providing additional pension capital. Pension plan members can participate in the pension plan both directly and through their employers.

From the age of 55, its members may receive the entire accumulated capital or continue membership and receive funds in instalments. Accumulated capital is private property, regardless of who paid the contributions, and is subject to the law of succession. Currently there are two types of Pension Level 3 private funds in Latvia:

- closed-end pension funds, which are intended only for employees and which have been established by their company (employees' involvement is the initiative of the employer);
- open pension funds, in which any person may become a member, either directly or through his/her employer, and which involve a specially licensed bank or a life insurance company.

There are six Pension Level 3 funds currently operating in Latvia: five open (subsidiaries of Latvian banks) and one closed pension fund. In total, Pension Level 3 pension funds offer 14 pension plans.
Table 2

<table>
<thead>
<tr>
<th>Date</th>
<th>Net assets, in thousands of EUR</th>
<th>Number of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.12.2009</td>
<td>94536</td>
<td>189499</td>
</tr>
<tr>
<td>31.12.2010</td>
<td>111928</td>
<td>191307</td>
</tr>
<tr>
<td>31.12.2011</td>
<td>119474</td>
<td>198575</td>
</tr>
<tr>
<td>31.12.2012</td>
<td>142423</td>
<td>207523</td>
</tr>
<tr>
<td>31.12.2013</td>
<td>235693</td>
<td>220646</td>
</tr>
<tr>
<td>31.12.2014</td>
<td>280784</td>
<td>236084</td>
</tr>
<tr>
<td>31.12.2015</td>
<td>305855</td>
<td>330416</td>
</tr>
</tbody>
</table>


Pension Level 3 private pension plans had accumulated more than 300 mln EUR in 2015; since the end of 2009, the figure has tripled. The number of participants in private pension plans is gradually increasing (see Table 2).

As shown in Figure 2, Pension Level 3 funds have been able to provide stable long-term capital gains to their investors, providing up to a 3.5% annual yield on the investment after deduction of commissions for the ten-year period.

Through looking at the Latvian pension fund managers’ submission, the authors conclude that Latvian pension fund managers’ investment strategy can be seen as conservative – 88% of the investment portfolio consists of investments in debt securities and investment funds, and 10% of the portfolio is a deposit with commercial banks (see Figure 3). Those investment strategies provide lower investment volatility, but the long-term performance is far below global market averages.

The amount of money accumulated in pension funds is growing rapidly and investment option problems are becoming more acute. Therefore, Latvia has no other option but to build a competitive financial market that is attractive to pension fund managers, unless it wants to cause this significantly
increasing, capital guaranteed maximum to stay in the country. A ban on investing in other countries is not possible, because it would violate fundamental principles of free movement of capital within the EU market.

Some financial instruments in Latvia are quite attractive to local pension fund managers; however, the range is very limited. The Latvian financial market can be seen as quite small and illiquid.

Unfortunately, local capital market development requires political will, which is still missing. Politicians are averse to abandoning or at least to reducing the state share in large enterprises, just as they are averse to making important decisions that could reflect favourably on the financial sector. The authors look at these attempts as a willingness to make cosmetic improvements in the situation, which does not solve the problem in the long term.

3. POLICY AND ECONOMIC ENVIRONMENT OF THE PENSION SYSTEM

The OECD (2011) prepared an overview of tax treatment of pensions and pensioners. The key results are as follows: “The personal tax system plays an important role in old-age support. Pensioners often do not pay social security contributions. Personal income taxes are progressive and pension entitlements are usually lower than earnings before retirement, so the average tax rate on pension income is typically less than the tax rate on earned income. In addition, most income tax systems give preferential treatment either to pension incomes or to pensioners, by giving additional allowances or credits to older people.”

Specifically, the following basic concepts (principles) of tax treatment for occupational schemes are currently used in the reference countries (Hughes, 2001):

- The EET principle (exempt contributions, exempt investment income and capital gains of the pension institution, taxed benefits) is used by the vast majority of EU member states, including Latvia, as well as the United States, Canada, Switzerland, Norway, and others;
- The ETT principle (exempt contributions, taxed investment income and capital gains of the pension institution, taxed benefits) is applied by three EU member states (Denmark, Italy, Sweden);
- The TTE principle (taxed contributions, taxed investment income and capital gains of the pension institution, exempt benefits) is used by New Zealand;
- The TET principle is applied in Iceland and Japan.

The authors agree with the conclusion of Vostatek, J. (2014) that different approaches to taxing public pensions and to social security contributions can be explained by differences in emphasis on various social models in different countries and by inconsistencies in the implementation of social and fiscal reforms. Increases in the retirement age, reductions of substitutability and increases in social taxes (or other payments, such as pension funds) can be observed around the world. It can be concluded that tax practice and theory is not uniform in its approach to the taxation of personal pensions. Modern tax policy has a tendency to stimulate significant retirement savings and ignore the fiscal costs associated with this. However, in a changing economic environment the EET principle seems to be insufficient for stimulating investments in private pension schemes. EU indirect tax policy also rejects taxation of personal pensions and other financial services by VAT on the basis of an alleged technical problem with the taxing of the margin.

Taxation and subsidization of pensions in Latvia and the EU require fundamental reform. The state grants various tax incentives for both companies where employee contributions are made in favour of third-pillar pension funds and individuals who are themselves engaged in such contributions. Third-pillar pension contributions to the pension fund which do not exceed 10% of gross salary are not subject to income tax. However, a decrease in mandatory social insurance contributions should be considered to ensure the motivation of employees for the third pension level. Currently the government of Latvia is highlighting that everyone needs to start thinking about their pensions themselves. This is being done during a time of disadvantage; in the period of the economic boom, when everyone had high incomes, no one spoke about it. Today, when the situation with the government budget is negative, people have started thinking about it. They do not understand and think that it is not fair to give a lot of their income to pensioners now, and at the same time they need to save money for themselves. Also, it is important to reduce the shadow economy and ensure social contribution compliance by supporting honest entrepreneurs and creating favourable conditions for conversion to the official economy, and to continue transformation of the State Revenue Service into a client-oriented tax administration.
The problems that the Latvian economy is facing today and will face over the next ten or twenty years, such as migration, low birth rates, the aging of society and changes in the national economy and the economy in general as a result of the crisis, lead to the fact that the burden on the social security budget will keep growing.

Economists claim that such a ratio, in which there are so few employees and so many dependants, especially pensioners, cannot be sustained in the long term. Latvia, like the entire EU, is undergoing significant demographic changes, and this process influences structural changes in the number of inhabitants. There will be slower economic growth in Latvia as a result of internal and external factors.

It is necessary to consider migration issue (immigration and emigration) policy seriously, so that it contributes to a qualified workforce and enhances economic growth. The government should develop a broad return-migration programme for Latvian citizens, including integration into the labour market and training and social inclusion measures.

The Latvian economic situation has been improving over the last 5 years, as shown by the main development indicators (see Table 3). Given global economic trends, the weak economic growth in the EU, and the recession in emerging markets, Latvian economic growth has slowed down in the last 2 years. But rather optimistic economic growth rates do not reflect the situation in terms of pensions and the authors conclude that the quality of life for older people will decrease in light of future demographic trends. This is why everyone should start thinking about their pensions now.

<table>
<thead>
<tr>
<th>Key indicators of economic development in Latvia, 2011-2015</th>
</tr>
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<tbody>
<tr>
<td>(Growth, in comparison with the previous year, %)</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td>---</td>
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<tr>
<td>Gross domestic product</td>
</tr>
<tr>
<td>Private consumption</td>
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<tr>
<td>Public consumption</td>
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<tr>
<td>Formation of total equity capital</td>
</tr>
<tr>
<td>Exports</td>
</tr>
<tr>
<td>Imports</td>
</tr>
<tr>
<td>Consumer prices</td>
</tr>
<tr>
<td>(% of GDP, unless indicated otherwise)</td>
</tr>
<tr>
<td>General government sector balance</td>
</tr>
<tr>
<td>General government debt</td>
</tr>
<tr>
<td>Changes in the number of employed persons</td>
</tr>
<tr>
<td>Unemployment rate</td>
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</table>


Since the previous population census carried out in 2000, the size of the population has decreased and in 2015 it constituted 1,986,096 inhabitants. The decrease in population has been due to natural population movement (the death rate increased the birth rate) and international migration.

The negative changes in structure and the number of the inhabitants are explained by the low birth rate and comparatively high death rate per 1000 inhabitants of Latvia. During the last seven years the situation has not improved. Every year a negative natural increase is created and this means that the death rate is higher than the birth rate.
In studying the age structure of the inhabitants of Latvia in 2014 (see Figure 4), the authors have come to the conclusion that the number of children up to age 15 is considerably lower than the number of people who have reached employment age in Latvia. This means that the demographic situation in Latvia has been worsening over the last few years and thus, the demographic load has been increasing. The generation that in 5-10 years could be economically active citizens and become taxpayers is very small in number. Demographers of Latvia point out the unwillingness or inability of the government to tackle the problem. Latvia has a favourable geographical location, so it will not remain empty; this is why the flow of immigrants could be the only way out of the situation for future pensioners. It is obvious that the government is not capable of solving this problem.

Most leading Baltic bank experts admit that the habit of saving for the future is more developed in Lithuania and Estonia. Lithuania is traditionally regarded as a nation of savers. 39% of the inhabitants make investments for their future. But Estonians have a greater possibility to save because the level of income is higher than in the other Baltic countries. 27% of the respondents are saving for old age, while in Latvia only 18% are doing so. This means that the ostrich policy is used or people rely on different alternatives which might add income to their pensions – continuing work after reaching retirement age or relying on their children’s or other relatives’ support. But it cannot guarantee an adequate income level in retirement.

The average monthly old-age pension in Latvia was 259 EUR in 2013, which, in comparison to the average pension benefit in 2009, rose by 26.7 EUR (10%), and it constituted 273.4 EUR in 2015; in turn, in 2015 average gross wages and salaries increased by 6.9%, reaching 818 EUR. The distribution of all pension benefits hardly changed in the period of 2009-2012 due to the fact that pensions were not indexed. Inhabitants with a length of service of less than 10 years were insured with the state social security allowance. The state social security allowance is guaranteed at 64.03 EUR.

There is a tendency across almost all European Union countries for the benefit ratio, which shows the ratio between the average gross public pension benefits and the average gross salary, to decrease. (Eichhorst et al., 2011) This is especially important for Latvia, which already has the lowest benefit ratio of all the countries, and it is predicted to become even smaller. These ratio tendencies show that in the future, supplementary pensions – for example, private pension funds – will become even more important in order to maintain a high life quality.

According to the current pension system and due to the demographic situation, the working people of today will receive lower pensions. This problem remains because the current demographic situation means that the number of retirees will grow, while the number of working people and taxpayers will continue to decrease. The pension system in Latvia has been formed in accordance with the principles of the classical finance pyramid. It works well when the number of new participants grows, that is, the number of taxpayers increases and the country experiences significant economic growth.

Pension reforms are needed in every country in order to reduce risks; however, they are carried out taking into account different conditions and limitations which are affected by demographic situations. Germany and Southern Europe – namely Italy, Portugal and Spain – are affected by the most severe demographic problems. As for the UK and France, this problem does not have such an impact on the population due to the higher birth rate (Borsch-Supan et al, 2005). In the case of Latvia, the demographic situation is extremely important. Not only is the ratio between the birth rate and death rate negative, as mentioned above, so-called “envelope salaries”, unemployment and migration to other countries also influence the pension system as the revenue from taxes decreases, so that less contributions to the

Figure 4. The age structure of the inhabitants of Latvia (2014) Source: CSB, 2015
pension fund are made. As a result, the state is forced to raise taxes, which slows down economic development.

Financial literacy and personal planning is a subject which has not gained much popularity in Latvia. Sociological research carried out by the Financial and Capital Market Commission in cooperation with the investigation centre SKDS on the financial literacy of inhabitants of Latvia revealed the participation level of inhabitants in using financial services. According to FCMC chief Kristaps Zakulis (2014), knowledge and activities related to various financial questions have also been clarified.

Pensioners who retired during the last two years and who had received a so-called “envelope” salary confess that they have felt a significant decrease in their income. If we compare the pre-pension income to the pension volume, the average drop in income constitutes 52%. This means that these retired persons have to live on a small income; accordingly, every fifth inhabitant of Latvia supports financially elderly relatives by allocating 138 EUR monthly. If the illegal economy does not decrease, given an ageing population and lack of long-term savings of a proper volume, in the future, the state budget might experience significant pressure. (Sauka & Putnins, 2015).

4. CONCLUSIONS

The level of Latvian economic efficiency is falling behind the average efficiency level in the EU significantly. The current model of economic development is characterised by low added value. The economic development of Latvia must be geared toward a high value-added and science and knowledge-based economic model.

In order to reduce the impact of increasing labour costs on the competitiveness of Latvian manufacturers, it is necessary to improve the competitiveness of the tax system. Fundamental reform of taxation of pension schemes should be considered so that an increase in private investment ensures sustainable development of the pension system.

It is necessary to increase the contributions to Pension Level 2 gradually. Pension Level 2 savings should be invested in more profitable financial instruments in Latvia and other countries.

It is necessary to ensure tax policy reform in the field of pension contributions in Latvia and the EU requires a fundamental reform. Re-estimation of contribution rates with revision of tax incentives for both employers whose employee contributions are made in favour of third-pillar pension funds and individuals who are themselves engaged in such contributions should be considered.

The Latvian government should encourage Latvian securities market development in order to stimulate the Latvian population’s pension saving investment in the Latvian economy. This could be achieved by raising capital (equity and borrowed) of state-owned enterprises through the local securities market. Its small size and lack of choice for investors are the main reasons for the underdeveloped securities market.

The government, in collaboration with the Financial and Capital Market Commission, should carry out an information campaign about benefits, opportunities for investments and Pension Level 3’s future role. The social tax should be decreased gradually by motivating people to apply for Pension Level 3. An accumulation system should be introduced when working people make contributions to private pension funds and later receive a pension from these savings.

Closed pension funds for employees of state structures and companies with state capital should be opened in order to promote this activity.

As regards the gradual increase in pension age, it is necessary to facilitate the system and availability of health care. This would enable pensioners to take care of their health and work effectively. It would include the necessity of having mandatory state-funded health checks every year.

REFERENCES

LONG-LIVED NON-FINANCIAL ASSETS IMPAIRMENT IN LATVIAN LISTED COMPANIES

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Abstract

Purpose of this research – To explore key aspects to consider in analysing information about impairment of long-lived non-financial assets reflected in financial statements, and to develop recommendations on what kind of issues should be considered in ensuring the accounting concept “true and fair view”.

Design / methodology / approach – The research is based on the analysis of 1) theoretical literature and research papers within the area of evaluation of long-lived non-financial asset impairment; 2) IAS 36; 3) the results of a survey, which in this research work sticks to a questionnaire containing 16 questions. The survey was sent out to all 28 Latvian companies listed on the Baltic Stock Exchange; the number of respondents was 25.

Findings – The main finding of this research paper is the identification of key issues to be considered in the impairment of long-lived non-financial assets to be sure a company’s financial statements reflect the real situation and conservatism of financial reporting has been ensured.

Research limitations / implications – There is a need for further research to find out whether / how the impairment (recognition / reverse) of long-lived non-financial assets influences companies’ financial results and information reflected in financial statements. The research period is from the end of the year 2013 to the year 2015.

Practical implications – The results of this research could be beneficial for academic researchers as well as educators and practitioners of financial statement analysis. The results obtained provide the possibility to identify problems in accounting practice with regard to impairment of long-lived non-financial assets and to formulate recommendations for further research.

Originality / value – The research conducted enabled the definition of possible problems in the accounting and reporting process of long-lived non-financial asset impairment in Latvian companies listed on the Baltic Stock Exchange.

Keywords: long-lived non-financial assets, impairment, IAS36.

1. INTRODUCTION

The current paper sets out to analyze issues related to the impairment of long-lived non-financial assets among Latvian companies listed on the Baltic Stock Exchange. There are different international and local laws and regulations that pertain to accounting of these assets for companies operating in the Republic of Latvia. But for a few years already, Latvian companies listed on the Baltic Stock Exchange have had to report their annual reports in accordance with International Financial Reporting Standards (hereinafter – IFRS), in particular International Accounting Standard 36 “Impairment of Assets” (hereinafter – IAS36).

The importance of issues related to the impairment of long-lived non-financial assets supports the idea expressed in many studies that it plays a significant role in defining the real value of a company’s assets reflected in its financial statements. Plus, taking into account that in the year 2014 the average proportion of these assets in the balance sheets of Latvian companies listed on the Baltic Stock Exchange was 48% (for most companies up to 97%), practices applied on impairment are essential to ensure transparent financial accounting and reporting. Usually this information is used by companies’ management and shareholders in decision-making processes as well as various other users to predict companies’ future cash flows and financial results. Also, the global economic situation stresses the importance of this issue.

The results of this research should be beneficial for academic researchers as well as educators and practitioners of financial statement analysis. The results obtained will provide the author with the
possibility of identifying possible problems in accounting practice with regard to impairment of long-lived non-financial assets and formulating recommendations for further research.

2. THEORETICAL FRAMEWORK OF THE RESEARCH

2.1. LONG-LIVED NON-FINANCIAL ASSETS

Long-lived non-financial assets are assets which should be used for more than one accounting period, ensuring a company’s basic business operations, plus generate profit for the company. Often companies make significant investments in acquiring this type of asset. Companies use these assets in their operations for a longer period of time in comparison to short-term assets. Therefore, companies also have more difficulties in evaluating the fair value of these assets. This leads to the fact that a company’s policy on impairment evaluation does have a considerable role in the company’s financial performance. Very often there are situations where these assets also constitute a significant proportion of total assets in a company’s balance sheet (Kozlovska, 2015). Therefore, the values of long-lived non-financial assets reflected in a company’s balance sheet play a significant role in the decision-making processes of the company’s management, the shareholders (existing / potential) and other users of the company’s financial data.

2.2. IFRS FOR IMPAIRMENT OF LONG-LIVED NON-FINANCIAL ASSETS – IAS36 “IMPAIRMENT OF ASSETS”

In accordance with International Accounting Standard 36 “Impairment of Assets”, every year on the balance sheet date, Latvian companies on the Baltic Stock Exchange have to assess whether there are any indications that a definite long-lived non-financial asset should be tested for impairment. In case there are such indications, the company must do an estimation of the recoverable amount of the particular asset. The exception is goodwill. In this case, impairment should be performed annually. Theoretically both researchers and professionals understand that the value of company assets is subject to significant changes due to the influence of various external and internal factors. In the author’s opinion the issue this research paper deals with is, at the moment, a very significant one companies are forced to deal with.

The key objective of IAS36 is to ensure that long-lived non-financial assets reported in a company’s financial statements reflect their real value – not more or less than the recoverable amount (the amount that can be obtained by either using them or selling them). This standard should be applied to all the company’s assets. The impairment should be performed every time the company’s financial statements are prepared. It is different for goodwill. In this case impairment should be performed when there are any indications of the impairment identified.

IAS36 states that all of a company’s long-lived non-financial assets should be grouped into cash-generation units. This unit is the smallest identifiable group of assets that generates cash flows independent from other assets. The only exception is goodwill, which generates cash flow on its own. Corporate assets such as research and development (hereinafter – R&D) present a problem. When tested for impairment, these assets do not generate cash flow independently. Therefore, in this situation these assets contribute to future cash flows not only of the cash generating unit under review, but also of other cash generating units (Burton, Jermakowicz, 2015).

2.3. THE INFLUENCE OF IAS36 ON A COMPANY’S FINANCIAL PERFORMANCE

In the author’s opinion, today the problem this research paper deals with is a very significant one companies are forced to deal with. The importance of issues related to impairment supports the idea expressed in many studies that impairment of long-lived non-financial assets plays a significant role in defining the real value of these assets reflected in companies’ financial statements. Nowadays the economic situation also stresses the importance of this issue. In order to evaluate the real situation and take the right decisions, it is very important that the values of these assets reflected in companies’ financial statements show their real, existing value and that impairment loss or reversal have been reflected in annual reports accordingly (Kozlovska, 2012).

The global financial crisis that started in the year 2008 emphasized that management and investors need to pay more attention to the process of company evaluation. Usually a company invests in long-lived non-financial assets with the goal of earning a maximum profit and generating positive cash flows in the future. But in the case of asset impairment, a risk of significant negative changes in future cash
flows arises. The author maintains that if accounting standards allow managers to reveal private information about long-lived non-financial asset values, impairment is expected to be related to future cash flows. The key problem is how to anticipate all possible effects of changes in the value of a long-lived non-financial asset due to impairment. A similar issue relates to the way this information has been presented to a company’s shareholders (Kuzmina, Kozlovska, 2012).

The idea of impairment for long-lived non-financial assets was developed to ensure the reliability of financial statements due to increasing manipulative activities on the part of companies’ management which were identified in devaluation of assets. This process does have a significant influence on investors’ decision-making processes and also the reliability of earnings (Zucca, Campbell, 1992).

Rennekamp, Rupar, and Seybert (2015) found that managers who are responsible for all decisions to record asset impairment invest more in case the accounting effect of the impairment is reversible as opposed to when it is not reversible. The author believes this issue is quite critical for the accounting concept of true and fair view. According to Trottier (Trottier, 2013), an online research instrument delivered to more than 100 Canadian managers concluded that managers are different in the way they record the impairment of long-lived non-financial assets. Those least likely to record impairment have specific bonus systems related to results and irreversible impairment rules. Managers who are more likely to record impairment are those who are sure this amount will be recovered in the next accounting periods.

Accounting setters are trying to improve legislation to ensure more transparent accounting. In January 2013, the European Securities and Markets Authority (hereinafter – ESMA) stated that there was about EUR 800 billion of intangible asset goodwill in the balance sheets of Europe’s largest companies. Nevertheless, ESMA pointed out that only 5% of this goodwill was written off, although the situation on European stock markets was not positive. There was a very similar situation during the same period in the United States. Various issues regarding IAS36 and impairment of long-lived non-financial assets arose. Impairment of goodwill in most cases has been accompanied with impairment of other long-lived assets (Komissarov et al., 2014). IAS36 theoretically improves the representational faithfulness of financial reporting by increasing the correspondence between an asset’s current value and its book value in situations when its economic value has been recovering. Also, it could cause managers to record losses in crisis situations more truthfully knowing they will be allowed to reverse it in the future. On the other hand, this norm could cause a situation where managers try to manipulate the timing of loss recognition and reversals in order to achieve some specific objectives. Allowance of reversals of impairment increases convergence of reporting practices among various accounting managers and ensures that accounting data related to impairment are more consistent, comparable, and timely (Trottier, 2013). The point of view of Piosik and Rówińska is based on the idea that asset impairment is influenced by changes in senior management more than company financial performance (Piosik, Rówińska, 2012). IASB’s accounting model confirms its “ambiguous” nature; it is prepared based on past data and partially also on future forecasted data (Pozzoli, Romano, and Romolini, 2011). Also, stock exchanges do have significant influence on how impairment of long-lived assets has been reported in companies’ financial reports. China is a good example. China-specific performance-based listing requirements plus recent experience evaluating how IASB’s recent developments in legislation of impairment shows that Chinese listed companies tend to reverse asset impairment. The key motivating factors are reducing and avoiding the possibility of trading suspension or even de-listing (Shimen, Yeutang, and Ziye, 2009).

Non-recognition of long-lived non-financial asset impairment also exists. It is influenced by factors like compensation, reputation, etc. of companies’ chief executive officers (hereinafter – CEOs), as well as violation of a bond indenture, etc. (Komissarov et al., 2014). According to Bond, Govendir, and Wells most Australian companies with indicators of impairment still do not recognise this impairment (Bond, D., Govendir, B., and Wells, P., 2016). Therefore, the author concludes that earnings management is closely related to the impairment of long-lived non-financial assets. The value relevance of reversal information has been negatively affected by regulatory-motivated earnings management. In an investigation performed on Taiwanese electronics companies, their management was found to be more likely to recognize impairment when there was a necessity to improve the company’s operational results. And vice versa – companies whose performance per specific accounting / reporting period was not very good tried to support opportunistic behaviour (Wang, Chan, Lu, Chang, 2015). Furthermore, based on an empirical study performed by Chen and Cheng, impairment of assets is adopted by loss
listed companies as a tool to manipulate profit before and after the use of accounting standards related to long-lived non-financial asset impairment. And impairment of assets is one of the ways loss listed companies manipulate earnings as well (Chen, Cheng, 2014). The behaviour of asset impairment has been influenced by various factors of earnings management (Guo, 2013). Possible solutions in this situation are numerous – favourable internal and external monitoring mechanisms limiting this type of earnings management (Shimen, Yeutang, and Ziye, 2009).

3. RESEARCH METHODOLOGY

The review of theory conducted in the previous section of this research paper allowed the author to form a general idea of the interest in the topic of impairment of long-lived non-financial assets in Latvian companies listed on the Baltic Stock Exchange as well as the extent of its development in the scientific literature and to formulate the basic research questions (RQ):

1. What are the key aspects to consider in analysing information about long-lived non-financial assets reflected in financial statements?

2. What kind of issues should a company consider regarding the impairment of non-financial long-lived assets?

In order to answer RQ1 and RQ2 the author analysed existing approaches and problems in Latvian companies listed on the Baltic Stock Exchange related to their practical experience in performing impairment of long-lived non-financial assets. The author developed a survey exploring impairment practices for long-lived non-financial assets in these companies. Therefore, the author used real data (information) obtained from 25 out of 28 Latvian companies listed on the Baltic Stock Exchange in the period from the end of 2013 to 2015. The companies represent the following industries – basic materials (code: 1000), industrials (code: 2000), consumer goods (code: 3000), health care (code: 4000), telecommunications (code: 6000), utilities (code: 7000), financials (code: 8000) and technology (code: 9000).

The author has analysed financial statements and has developed a questionnaire for Latvian companies listed on the Baltic stock exchange and obtained answers to the following questions regarding evaluation of long-lived non-financial asset impairment:

1. What is the name of your company? (not mandatory)
2. What is the operating sector of your company?
3. Are you familiar with IAS36?
4. Which long-lived non-financial asset categories are being revaluated for impairment?
5. As of which year has evaluation of long-lived non-financial asset impairment been performed? (more than one answer possible)
6. What are the key internal and external factors influencing evaluation of long-lived non-financial assets for impairment? (more than one answer possible)
7. Do you have any comments / suggestions regarding existing legislation of impairment of long-lived non-financial assets?
8. What are the key sources of information used to define the fair value of long-lived non-financial assets evaluated for impairment? (more than one answer possible)
9. Does the company evaluating long-lived non-financial assets for impairment apply any discount rate?
10. What was the discount rate applied when the company performed the last impairment of its long-lived non-financial assets?
11. What factors did you take into account in defining this discount rate? (more than one answer possible)
12. Have you recognized impairment of any long-lived non-financial assets in financial statements per respective period? If so, how was this information reflected?
13. In case the company recognized impairment of any long-lived non-financial assets in particular financial statements, was the depreciation / amortization method for these assets changed?
14. How have impairment losses been recognized in the company’s financial statements per particular period?
15. What types of problems has the company faced in implementing / applying IAS36?
16. What are possible problems and your opinion / suggestions regarding legislation of evaluation of long-lived non-financial asset impairment?

The author discovered that in most cases companies’ long-lived non-financial assets also constitute a considerable part of companies’ total assets in their statements of financial position or balance sheets. In the year 2014, on average this proportion in the balance sheets of Latvian companies listed on the Baltic Stock Exchange was 48%. For most of these companies this percentage was higher and for some companies it was up to 97%. Table 1 below displays information about long-lived non-financial assets in the balance sheets of Latvian companies listed on the Baltic stock exchange in the year 2014 (Kozlovska, 2015).

<table>
<thead>
<tr>
<th>Nb.</th>
<th>Company</th>
<th>Value of BS, FY 2014 (EUR)</th>
<th>Long-lived non-financial assets, FY 2014 (EUR)</th>
<th>Proportion of long-lived assets (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AS Baltic Telekom</td>
<td>2 329 019</td>
<td>-</td>
<td>0%</td>
</tr>
<tr>
<td>2</td>
<td>AS Brivais Vilnis</td>
<td>8 908 364</td>
<td>4 031 823</td>
<td>45%</td>
</tr>
<tr>
<td>3</td>
<td>AS Dāguavpils Lokomožīļu remonta rūpnīca</td>
<td>27 287 823</td>
<td>16 046 885</td>
<td>59%</td>
</tr>
<tr>
<td>4</td>
<td>AS Dītton pievadķēžu rūpnīca</td>
<td>11 280 116</td>
<td>5 818 535</td>
<td>52%</td>
</tr>
<tr>
<td>5</td>
<td>AS Grīnoks</td>
<td>160 006 467</td>
<td>78 396 714</td>
<td>49%</td>
</tr>
<tr>
<td>6</td>
<td>AS Grīņa</td>
<td>18 843 583</td>
<td>15 223 427</td>
<td>81%</td>
</tr>
<tr>
<td>7</td>
<td>AS Kurzemes Atslēga 1</td>
<td>1 906 371</td>
<td>702 764</td>
<td>37%</td>
</tr>
<tr>
<td>8</td>
<td>Kurzemes CMAS</td>
<td>1 669 729</td>
<td>908 057</td>
<td>54%</td>
</tr>
<tr>
<td>9</td>
<td>AS Latvijas Balzāns</td>
<td>123 497 624</td>
<td>53 577 753</td>
<td>43%</td>
</tr>
<tr>
<td>10</td>
<td>AS Latvijas Gāze</td>
<td>747 970</td>
<td>563 904</td>
<td>75%</td>
</tr>
<tr>
<td>11</td>
<td>AS Latvijas Jūras medicīnas centrs</td>
<td>7 246 744</td>
<td>5 059 945</td>
<td>70%</td>
</tr>
<tr>
<td>12</td>
<td>AS Latvijas Kuģniecība</td>
<td>60 957 855</td>
<td>2 310 338</td>
<td>4%</td>
</tr>
<tr>
<td>13</td>
<td>AS Latvijas tiltī</td>
<td>24 964 140</td>
<td>9 113 038</td>
<td>37%</td>
</tr>
<tr>
<td>14</td>
<td>AS Olainfarm</td>
<td>106 723 000</td>
<td>53 522 000</td>
<td>50%</td>
</tr>
<tr>
<td>15</td>
<td>AS Rīgas autoelektroaparātu rūpnīca</td>
<td>5 726 988</td>
<td>4 000 124</td>
<td>70%</td>
</tr>
<tr>
<td>16</td>
<td>AS Rīgas elektromašīnbūves rūpnīca</td>
<td>39 197 228</td>
<td>22 471 218</td>
<td>57%</td>
</tr>
<tr>
<td>17</td>
<td>AS Rīgas farmaceitiskā rūpnīca</td>
<td>2 141 327</td>
<td>566 958</td>
<td>26%</td>
</tr>
<tr>
<td>18</td>
<td>AS Rīgas juvelierizstrādājumu rūpnīca</td>
<td>1 566 887</td>
<td>187 914</td>
<td>12%</td>
</tr>
<tr>
<td>19</td>
<td>AS Rīgas kuģu ābētēve</td>
<td>46 854 780</td>
<td>30 024 202</td>
<td>64%</td>
</tr>
<tr>
<td>20</td>
<td>AS SAF Tehnīka</td>
<td>12 076 449</td>
<td>728 993</td>
<td>6%</td>
</tr>
<tr>
<td>21</td>
<td>AS Salīdus mežrūpniecība</td>
<td>31 840 134</td>
<td>20 080 685</td>
<td>63%</td>
</tr>
<tr>
<td>22</td>
<td>AS Siguldas CMAS</td>
<td>1 564 523</td>
<td>389 839</td>
<td>25%</td>
</tr>
</tbody>
</table>
4. ANALYSIS OF THE RESEARCH RESULTS

In the author’s opinion, nowadays the issue this section deals with and companies are forced to deal with is a very important one. This has been supported by numerous studies. Impairment of long-lived non-financial assets plays a significant role in defining the real value of these assets reflected in companies’ financial statements. Managers who are responsible for all the decisions to record asset impairment invest more in case the accounting effect of the impairment is reversible as opposed to when it is not reversible (Rennekamp et al., 2015).

Also, accounting setters are trying to improve legislation to ensure more transparent accounting. According to Trottier, IAS36 theoretically improves the representational faithfulness of financial reporting by increasing the correspondence between an asset’s current value and its book value in situations when their economic value recovers. Also, it could cause managers to record losses in crisis situations more truthfully knowing they will be allowed to reverse it in the future. On the other hand, this norm could cause a situation where managers try to manipulate the timing of loss recognition and reversals in order to achieve some specific objectives (Trottier, 2013).

Since the proportion of long-lived non-financial assets in the total balance sheet value is quite significant (on average 48%, but for some companies up to 97%) among Latvian companies listed on the Baltic Stock Exchange, it is very important that the values of these assets reflected in companies’ annual reports show their real, existing value. In accordance with IFRS – IAS36, a company has to ensure that its long-lived non-financial assets reported in financial statements reflect their real value – not more or less than the recoverable amount (the amount than can be obtained by either using them or selling them). Impairment should be performed every time the company’s financial statements are being prepared. The exception is goodwill.

Based on the results of the survey performed, the author came to the conclusion that although impairment of long-lived non-financial assets is a very important and hot topic, especially nowadays there are still companies that do not know what it is and do not apply this standard. 24% of the respondents answered that they have not heard about IAS36 and the term “impairment”. 76% answered in the affirmative to the question of whether they have heard about IAS36 and “impairment”. In some situations, this could be explained by management’s beneficial situation. Non-recognition of impairment of long-lived non-financial assets does exist as well. It is influenced by factors like compensation, reputation, etc. of companies’ CEOs, as well as violation of a bond indenture, etc. (Komissarov et al., 2014).

In Table 2.2.6. below the author has summarized which long-lived non-financial assets are being tested for impairment by Latvian companies listed on the Baltic Stock Exchange.

<table>
<thead>
<tr>
<th></th>
<th>Company Name</th>
<th>Current Value</th>
<th>Book Value</th>
<th>Impairment %</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>AS Talsu mežrūpniecība</td>
<td>1 021 129</td>
<td>646 457</td>
<td>63%</td>
</tr>
<tr>
<td>24</td>
<td>AS Tosmares kušģūvētava</td>
<td>10 288 965</td>
<td>6 182 931</td>
<td>60%</td>
</tr>
<tr>
<td>25</td>
<td>AS Valmieras stikla ūdensūdens</td>
<td>122 995 264</td>
<td>77 049 989</td>
<td>63%</td>
</tr>
<tr>
<td>26</td>
<td>AS VEF</td>
<td>5 817 411</td>
<td>5 627 504</td>
<td>97%</td>
</tr>
<tr>
<td>27</td>
<td>AS VEF Radiotehnika RRR</td>
<td>8 012 134</td>
<td>7 443 213</td>
<td>93%</td>
</tr>
<tr>
<td>28</td>
<td>AS Ventspils nafta</td>
<td>315 336 468</td>
<td>52 997</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Average:</td>
<td></td>
<td></td>
<td>48%</td>
</tr>
</tbody>
</table>

Source: Nasdaq.com
Table 2

Categories of long-lived non-financial assets to be revaluated for impairment in Latvian companies listed on the Baltic Stock Exchange (2015)

<table>
<thead>
<tr>
<th>Category</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed assets</td>
<td></td>
</tr>
<tr>
<td>Real estate</td>
<td>36</td>
</tr>
<tr>
<td>Equipment</td>
<td>21</td>
</tr>
<tr>
<td>Investment property</td>
<td>11</td>
</tr>
<tr>
<td>Other (not evaluated for impairment)</td>
<td>32</td>
</tr>
</tbody>
</table>

Source: Author’s own study

Based on the results obtained, the author concludes that in Latvian companies testing for impairment, if it has been performed, it has been done only for fixed assets. Impairment of intangible assets is an unresolved issue on the global level as well. Also, from the answers received, the author found that Latvian companies listed on the Baltic Stock Exchange have performed evaluation for long-lived non-financial asset impairment since the years 1997, 2000, 2001, 2002, 2007, 2008, and 2011.

Theoretically both researchers and professionals understand that the value of company assets is subject to significant changes due to the influence of various external and internal factors defined in IAS. The opinions expressed by foreign researchers support the idea that the depreciation and amortization expense is informative about a firm’s investments and positively associated with future cash flows (Barth, Cram, and Nelson, 2001). Although this sounds convincing and logical, there are opposing positions stating that impairments are indicative of a company’s inability to generate future cash flows (Gordon, Hsu, 2012).

In assessing indications of possible impairment of long-lived non-financial assets, companies should consider various internal and external factors. IAS36 stipulates that on every reporting date, a company has to evaluate whether there are any indicators that a particular long-lived non-financial asset should be impaired. The exception is an intangible asset – goodwill – which should be evaluated for impairment on an annual basis. There are various internal and external factors mentioned in IAS36, but Table 3 below shows factors indicated by Latvian companies listed on the Baltic Stock Exchange.

Table 3

Factors for possible impairment of long-lived non-financial assets indicated by Latvian companies listed on the Baltic Stock Exchange (2015)

<table>
<thead>
<tr>
<th>External factors</th>
<th>%</th>
<th>Internal factors</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation on the market (increase / decrease of the value)</td>
<td>50</td>
<td>Asset's physical deterioration</td>
<td>27.8</td>
</tr>
<tr>
<td>Other (e.g. credit policy, asset not used for some period of time, asset has not been revaluated for impairment)</td>
<td>25</td>
<td>Asset’s obsolescence</td>
<td>19.4</td>
</tr>
<tr>
<td>Negative trends / changes in the economy, legislation, market, technological development</td>
<td>12.5</td>
<td>Other (asset continues to participate in the production despite the fact that it has already been depreciated / asset has been revaluated only in case its value is lower than its market value / assets are not being revaluated for impairment)</td>
<td>19.4</td>
</tr>
<tr>
<td>The company's share value is lower than its book value</td>
<td>12.5</td>
<td>The relevant part of the fixed asset is written off or restructured</td>
<td>16.7</td>
</tr>
<tr>
<td>The company's economic activity has not been as good and successful as planned</td>
<td>16.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s own study
Most Latvian companies listed on the Baltic Stock Exchange use market prices as information sources – 68% – while 21% use information attainable on the Baltic Stock Exchange. 12% use various other sources – certified experts’ evaluations, previous experience or even auditors. Since 86% of long-lived non-financial assets impaired by Latvian companies listed on the Baltic Stock Exchange are related to real estate, investment property or equipment, the source of information is logical – information on the market constituting 66%. Other sources of information include information available on the stock exchange – 22% – and other sources such as assessments from certified appraisers, auditors’ opinions, experts and historical data: 12%.

To calculate the recoverable amount of a particular long-lived non-financial asset evaluated for impairment it is necessary to compare the asset’s fair value less cost to sale and the asset’s value in use. The larger of these two amounts should be selected as the asset’s recoverable amount. In order to calculate the asset’s value in use it is necessary to perform a calculation of related cash flow projections and the discount rate. It is interesting that only 1 of the 25 companies surveyed indicated that it uses a discount rate. This rate has been defined based on national inflation interest rates, the country risk-free interest rate, and the market debt rate (e.g. 5Y USD SWAP rate + 3% risk margin on debt).

Hilton and O’Brien (2009) and Petersen and Plenborg (2010), cited in Paugam and Ramond (2015), found that impairment testing relies on evaluation models judged by the company’s management (Paugam, Ramond, 2015). The results of the survey also show that the management decides whether and how to calculate the amount of long-lived non-financial asset impairment, and is able to manipulate calculations and figures reflected in financial statements.

The most important thing for users of companies’ financial statements is the transparency of the information reflecting the companies’ business per particular accounting period. Based on the author’s investigation the situation in Latvian companies listed on the Baltic Stock Exchange is not very good. Only 60% of companies provide information related to impairment of long-lived non-financial assets in their financial statements. This information is reflected in the statement of comprehensive income (profit and loss statement), in the asset movement table in the notes or as a revaluation reserve in the statement of financial position or balance sheet. The author came to the conclusion that companies which do provide information about the impairment of these assets in their financial statements do so in the right way and as stipulated by IAS36. The remaining 40% of companies do not provide this information in their financial statements. Those that provide this information in their financial statements also mentioned that recognition of impairment of long-lived non-financial assets does not cause any changes in companies’ depreciation / amortization methods for these assets. Therefore, the author can conclude that it is not safe to use the financial statements of Latvian companies listed on the Baltic Stock Exchange when the user is not sure he sees a true and fair view of the company’s performance. Therefore, it is advisable for users, including shareholders, to be very attentive in case the company owns a significant amount of long-lived non-financial assets and to take into account that possible impairment should be recognized per particular accounting period. The author would like to emphasize this because some respondents answered the question “How does the company recognize in the company’s financial statements the impairment loss of its long-lived non-financial asset value; and does the company encounter any problems in connection with the implementation of IAS36?” in the following way: “Since local accounting standards include all issues related to impairment under IAS36, we do not see any problems in the evaluation for the impairment process” or “our long-lived non-financial assets are very old and already depreciated. Therefore, we do not see a necessity to perform any impairment of these assets”.

In accordance with legislation, companies listed on the Baltic Stock Exchange do have to report their financial statements under IFRS, including IAS36. Most answers received from companies providing impairment in their financial statements showed that there are not any problems regarding how to provide impairment loss in the company’s financial statements – if companies do the accounting correctly as stipulated in IAS36. Companies that do not provide impairment in financial statements answered that this issue is not relevant at the moment since they do not provide this information. The author believes that practices related to impairment of long-lived non-financial assets and IAS36 should be viewed in a wider circle, not only among accountants, but also among managers and even shareholders. Impairment of assets is a multidimensional issue, and one person – an accountant – is obviously unable to solve it, even if the company may have developed a detailed accounting policy. Latvian companies are making their first attempts to implement IAS36 but facing a number of
challenges, i.e. now they need to address serious issues of both an organizational and a methodical nature (Kuzmina, Kozlovska, 2012).

The author also analysed answers received from companies about their opinion on today’s topics and issues related to the application process for IAS36, what should be changed, implemented in legislation, etc. Companies which did have comments mentioned issues related to the complicated methodology for rebates of investments in these assets and to legislation and the experience of the European Union; the need for significant changes, especially regarding real estate; or they even answered that they have problems, but it is difficult to define those related to depreciation and amortization due to recognition of impairment. Only one company answered that they are satisfied with the existing rules and regulations.

Based on the results described above, the author believes that evaluation of long-lived non-financial asset impairment is problematic and there is a need to implement more detailed explanations regarding IAS36 and methodology, when and how companies should perform impairment. This is also because impairment influences the balance sheet values of these assets and also figures in statements of financial position or balance sheets and in statements of comprehensive income or profit and loss statements. Long-lived non-financial assets comprise a significant part of companies’ total balance sheet values plus today’s economic and political situation. A similar point of view has been expressed by Liu – asset impairment requirements are inconsistent and their treatment of the results of asset impairment is not standardized (Liu, 2012).

5. CONCLUSIONS

Based on the research performed, the author came to the conclusion that there is a significant need to develop specific models / mechanisms for companies to apply in order to manage evaluation of long-lived non-financial assets impairment. Not only companies, but also regulatory institutions and society as a whole should pay more attention to such issues. Today’s economic and political situation and the process of globalization reinforces the importance of this topic.

The survey conducted by the author enabled her to explore the key aspects to consider in performing and analysing information related to the evaluation of long-lived non-financial asset impairment. The results obtained provide the author with the possibility to identify possible problems and areas for improvement in accounting practices and to formulate recommendations for further research.

It should be mentioned that the results of the survey are not as positive as expected. According to the study results, the situation in Latvian companies listed on the Baltic Stock Exchange is not very good. Only 60% of companies provide information related to impairment of long-lived non-financial assets in their financial statements. 24% of respondents answered that they have not heard about IAS36 and the term “impairment”. This means that there is a possible risk of a situation where earnings management or manipulation of information in a company’s financial statements could be identified. The theoretical research performed supports the author’s conclusion about the close relatedness between earnings management and impairment of long-lived non-financial assets. The fact that in most companies investigated in this research long-lived non-financial assets constitute a considerable part of total assets in their balance sheets stresses the importance of issues related to the evaluation of impairment.

The goals of this research have been achieved. The results of this research may be beneficial for academic researchers, educators, and practitioners of financial statement analysis as well as the management of any company that has long-lived non-financial assets in its balance sheet. There is a need for further research to find out whether / how the impairment (recognition / reverse) of long-lived non-financial assets influences companies’ financial results and information reflected in financial statements.

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SOCIAL ENTERPRISES’ STARTUPS: POSSIBILITIES AND BARRIERS

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Abstract
Purpose - In capital markets, the primary interest of all parties involved is to build a profitable entity and to earn a high return on investments. Meanwhile, social enterprises’ primary goal is to solve topical social and economic issues of society. Thus, the capacity to attract funding is tied to the specific social problem or need that is being addressed. Consequently, social enterprises dispose of fewer channels for accessing unrestricted sources of risk seed capital than traditional ones. The purpose of this paper is to investigate the possibilities and barriers with regard to social enterprises becoming startups.

Design/methodology/approach – Qualitative research methods including individual semi-structured interviews with experts and desk research were undertaken.

Findings – As startups, social enterprises possess the ability to attract investments, especially impact and angel investments.

Research limitations/implications – Due to the limited time, validity and generalisation, further research with additional data is needed to verify social enterprises’ envisaged possibilities of being startups. Also, continued efforts are required to adjust risk capital markets to some extent, making them more accessible to social entrepreneurs’ needs.

Originality/value – The article suggests that there are certain expectations to receive social and financial returns on investments and this balance could benefit both investees (social enterprises) and investors, as well as society on the whole.

Keywords: social enterprises, startups, financial mechanisms

JEL Classification: L31, M13, G21

Classification: Research paper

1. INTRODUCTION
Setting up a social enterprise startup can be more complicated than launching a traditional one since the social mission is as important as financial viability, resulting in greater difficulty in accessing capital and funds, which arises from the limited or even absent understanding of social enterprises and of the social value they generate.

The aim of this research paper is to investigate the possibilities and barriers for social enterprises with regard to becoming startups. The article bridges the gap in the existing knowledge on how social enterprises might be startups that attract various investors.

In order to fulfil the aim of the paper the following tasks were assigned: to examine possibilities and barriers that social enterprises might encounter as startups approaching potential investors; to clarify areas of business where social enterprise startups might succeed; to determine who social enterprises’ potential investors could be and to examine other funding possibilities; to define the proper supporting mechanisms of social enterprise startups.

This article provides an overview of SE startup possibilities and barriers and presents the findings of prominent authors such as Blank, S. and Dorf, B., Ries, E., Mair, J. and Marti, I., Miller, T., Austin, J., Nicholls, H., LePoutre, J. and others on the issues of social enterprises and startups.

Moreover, in this paper the author has outlined an acknowledged need to access seed and growth-stage capital to foster social enterprises’ development and their positive impact on society. It is undeniable that social enterprises have far fewer channels for accessing unrestricted sources of capital.

2. THEORETICAL FRAMEWORK OF THE RESEARCH
Social entrepreneurs create social enterprises by identifying a social problem, pursuing opportunities based on it and developing an innovative means of addressing the problem that generates social and economic value (Mair and Marti, 2006). That is, social enterprises are organizations that
address conditions harmful to society using business (i.e. market-based) methods (Miller et al., 2012). Hence, social entrepreneurship has been labelled “caring capitalism” because of the achievement of relevant social goals within a market framework (Hibbert et al., 2005; Herman and Rendina, 2001).

In fact, social enterprises do business by putting society and positive social change at the core of all their activities. As a sector, social entrepreneurship is experiencing explosive growth (Lepoutre et al., 2013) and is attracting growing amounts of entrepreneurial talent, funding and attention (Choi and Majumbar, 2014).

Lepoutre et al. (2013) have found that countries with higher rates of traditional entrepreneurial activity also tend to have higher rates of social entrepreneurial activity. Also, they explored types based on social mission, revenue model, and innovativeness while developing a methodology to measure population-based social entrepreneurship activity prevalence rates using the Global Entrepreneurship Monitor (GEM) methodology of Total Entrepreneurial Activity (TEA).

The Social Business Initiative’s (SBI) definition of a social enterprise incorporates its three key dimensions, which have been developed over the last decade through academic and policy literature:

- an entrepreneurial dimension: engagement in continuous economic activity;
- a social dimension: a primary and explicit social purpose; and
- a governance dimension: the existence of governance mechanisms to ensure prioritisation of the social purpose and which demonstrate sensitivity to different stakeholder interests.

Similarly, the set of core criteria reflecting the obligatory conditions that an organization has to meet to be identified as a social enterprise under the EU definition are as follows:

- the organisation must engage in economic activity;
- it must pursue an explicit and primary social aim that benefits society;
- it must have limits on distribution of profits or assets to prioritise the social aim;
- it must be independent from the State or other for-profit organisations;
- it must have inclusive governance i.e. characterised by participatory and/or democratic decision-making processes.

Meanwhile, Kerlin (2006) noted that a social enterprise means different things in different national contexts. Thus, there is a sophisticated discourse about both the criteria and definition of a social enterprise and social entrepreneurship as a whole. Haugh (2005) emphasised that a social enterprise is a collective term for a range of organizations that trade for a social purpose adopting one of a variety of different legal formats but sharing the principles of pursuing business-led solutions to achieve social aims and the reinvestment of surplus for community benefit. The objectives focus on socially desired, nonfinancial goals and their outcomes are the non-financial measures of the implied demand for and supply of services. Respectively, Mair & Marti (2006) assume that social entrepreneurship brings about social change and should be viewed as a cross-sectoral domain where legal structure and sectoral belonging are less important and social change prevails. Analogically, Nicolls (2006) reckons that “social entrepreneurship represents an umbrella term for a considerable range of innovative and dynamic international praxis and discourse in the social and environmental sector”.

One critical issue that has yet to receive extensive attention is how social entrepreneurs acquire the resources they need. Like traditional entrepreneurs, social entrepreneurs must assemble financial capital and other resources to launch and grow their organizations (Austin et al., 2006). Specifically, there seems to be widespread agreement among practitioners that social entrepreneurs confront considerable resource acquisition challenges (Kim et al., 2011), as, quite often, social enterprises are not well understood by traditional investors, who usually think in black and white terms regarding charity and business.

Furthermore, a social enterprise represents an organizational form that fosters two different types of logic: social-welfare and economic (Nicholls, 2010). As Philip (2014) notes, combining multiple types of logic means that social entrepreneurs need to balance them, not only in performing activities but also in ensuring well-developed business narratives in communication with investors by emphasizing strong business models.

In spite of the fact that social enterprises have gained international prominence and acknowledgement worldwide by putting forward social and environmental goals along with economic values, the issue of their financial sustainability is still topical.

To be more precise, little research has been conducted to investigate the possibilities and barriers
for social enterprises with regard to becoming startups in the Baltic States. Few attempts have been made to identify and analyse the specific possibilities and barriers for social enterprises as startups in the Baltic States.

As to startups’ essence, Blank and Dorf (2012) define a startup as “an organization formed to search for a repeatable and scalable business model”, where agile development eliminates wasted time and resources by developing the product iteratively and incrementally. It is undeniable that a typically successful startup has to be highly profitable, quickly generating immense return on investments for its investors.

Boschee & McClurg (2003) consider that only earned income will ever allow a social enterprise to become a financially sustainable or self-sufficient entity without depending on charitable contributions and public sector subsidies. Profitability is a goal, but it is not the only one, and profits are re-invested in the mission rather than being distributed to shareholders (see Figure1).

Figure 1. Social Enterprise Startups’ Goals
Source: created by the author

SE startups’ goals incorporate social and economic goals in order to solve burning social problems while at the same time being financially sustainable.

Social entrepreneurship involves the recognition, evaluation, and exploitation of opportunities (Austin et al., 2006) and demonstrates “risk-tolerance, innovativeness and pro-activeness”, similarly to conventional entrepreneurship, in the social arena (Peredo and McLean, 2006). Specifically, the fundamental premise of social entrepreneurship is to use business knowledge and entrepreneurial principles to solve critical dilemmas facing a society regarding economic, social and environmental problems (Germak and Singh, 2010). Moreover, social entrepreneurs are enterprising individuals “devoted to making a difference and reshaping the way we think about social value creation” (Mair and Marti, 2006). Several scholars and researchers have characterized such enterprises as “hybrids” (Davis, 1997) to reflect their combined interest in creating social value, which is the basis of social entrepreneurship, and generating profit, which is the primary goal of commercial entrepreneurship.

Furthermore, the theory of Lean Startup Methodology (LSM) represents an advanced approach to doing business with the emphasis on agile testing and learning from the customer to produce solution-based products. This is an iterative process where problem, product, and customer hypotheses are developed and validated (Ries, 2011).

In accordance with an OECD (2013) report social enterprises may be newly created startups or entities created by the transformation of pre-existing private or government organisations.

As a matter of fact, the proactive approach of impact investment might generate a measurable social and financial return. Among the products and strategies that correspond to it as sources of financing for social enterprises, the following could be mentioned: quasi-equity / equity instruments in ethical or social capital markets; solidarity finance; venture philanthropy; individual investment; institutional investment (Mendell and Nogales, 2009); and crowdfunding.

Family offices and high-net-worth individuals constitute approximately 17% of total capital raised by fund managers and are among some of the leading investors in impact investments – a practice forecast was worth $12.7 billion (€9.4 billion) in 2014, according to the Impact Investor Survey, released by JP Morgan and the Global Impact Investing Network (GIIN).

Alongside this, innovative institutional arrangements between financial organisations and governments might be advocated, for instance through policy measures that co-invest with the private sector and that pursue social returns as well as financial ones. This could be executed by various means, embracing fiscal incentives for investors in social enterprises and/or direct inclusion of public funds into financial mechanisms, fostering cooperation between financial organisations, the third sector and governments (Mendell and Nogales, 2009).
**Social capital markets** are dedicated to the flow of capital towards the social good by addressing society’s toughest challenges. As Mendell and Nogales (2009) revealed, in spite of the criticisms and some experience of failure in launching such a system, the conception of a social finance exchange continues to attract social investors, proving that doing good has two bottom lines: social and financial.

**Solidarity finance** is distinguished by the fundamentally principal role of citizens and the variety of socially oriented projects that are supported. The developing sphere of solidarity finance could serve as a meaningful source of capital for social enterprises that meets the criteria required by socially responsible investors (through placements or pro-active investments) expanding this activity to the social investment market (Kritikos, et al., 2007). In Europe there is a network of solidarity finance organisations (FINEUROSOL), which is supported by the European Commission.

**Venture philanthropy** is the utilisation of the venture capital model for a social investment strategy to generate blended returns in the form of financial revenues and social impact. Innovative social investment strategies incorporate finance, business advice and monitoring, allowing social venture philanthropists to introduce new methods by modifying the focus from what were regarded as no-return and maximum-risk charitable funds to the innovative entrepreneurial aspect of initiatives (Cheek, et al., 2015). In Europe the European Venture Philanthropy Association (EVPA) operates quite successfully, representing a variety of venture philanthropists who are engaged in financing social enterprises.

It has been found (OECD, 2013) that **individual investors** are also a source of finance for social enterprises, although their presence is uneven across countries. Two types have been identified: the first refers to socially motivated **high-net-worth investors** (angel investors) whose money is managed by financial advisors, with investments ranging from EUR 100 000 to a few million euro on a long-term basis; the second type is represented by **small-scale investors** (citizen investors), who support local initiatives through local circles of investors with financing from very small amounts to EUR 10 000.

**Institutional investors**, including pension / mutual funds, insurance companies and banks, do not invest in social enterprises directly but through intermediaries as dedicated debt or equity-oriented investment funds since they lack expertise in identifying and selecting social enterprises (Groh and Liechtenstein, 2009). For example, over the last decade in France, the US and Canada, institutional investors have already been targeting the needs of social enterprises, but there are some obstacles in terms of legal issues and adherence to fiduciary responsibility. Also, the European Parliament has approved new regulations on European social entrepreneurship funds and European venture capital funds.

**Crowdfunding** could contribute to the needs of social enterprises in terms of equity being a powerful alternative to traditional investors. Crowdfunding or microcredit platforms such as Kiva, Just Giving and Babylloon have been raising extensive funds dedicated to social projects. According to the Crowdfunding Centre (2014), the highest performing countries based on the number of successful projects (period: 2014 Q2 - April, May & June) were the USA, the UK, Canada, Germany, France, Australia and Italy. Research on crowdfunding in Europe performed by the European Crowdfunding Network (2014) suggests that in order to promote crowdfunding, the European Commission should create a legal framework. Also, Profatilov, Bykova & Olkhovskay (2015) consider that "crowdfunding gains more and more economic power and requires regulation at the legislative level".

Regarding Latvian social enterprises, it could be stated that they lack not only a legal framework and recognition in society but also the financial support mechanisms revealed in a study by Lesinska et al. (2012), including financial instruments to attract private investors as well as state and municipal grants and a more developed ecosystem embracing business incubators, accelerators, and hubs dedicated to social enterprises. As Lesinska (2014) noted, most social enterprises in Latvia chose the legal form of the association, that is, non-profit, in looking for donors in order to obtain financing, and only a small part of social enterprises generated some return on economic activities.

A country report (Wilkinson et al., 2014) disclosed that the social investment market did not exist in Latvia. When approaching banks or investors, social enterprises are treated the same as any other enterprise; there are no specialist intermediaries or financial products catering to the specific business models and/or needs of social enterprises. Most social entrepreneurs started their businesses with their own capital, indicating a lack of willingness to take out bank loans due to the perception that external borrowing would decrease their level of independence. Currently, grants are the main form of external finance available to social enterprises.
It has been assumed (EC, DG for Employment, Social Affairs & Inclusion, 2015) that social enterprises in Europe typically adopt a ‘hybrid’ business model, i.e. they derive their revenues from a combination of: market sources, e.g. the sale of goods and services to the public or private sector; and non-market sources, e.g. government subsidies and grants, private donations, non-monetary or in-kind contributions such as voluntary work, etc. Social enterprises thus rely on a mix of revenue streams.

Aside from this, a notable dynamic through which social enterprises are generating earned income is the increasing contracting out of services in healthcare, social care, education, criminal justice, leisure and a host of other areas by public authorities across Europe as a means of securing the best value for money and offering greater choice and personalisation to the users of these services.

The author considers that the variety of potential areas where social enterprises might operate, benefitting society and at the same being profitable, could expand along with changes in society by providing solutions to topical problems, as there are still some gaps which the business and public sectors cannot resolve.

3. RESEARCH METHODOLOGY

A triangulation principle has been utilized in this research paper since it is a powerful technique that facilitates validation of data through cross-verification from several sources, both primary and secondary, and by exploiting the following methods: an empirical qualitative research method, in particular semi-structured expert interviews in the fields of social entrepreneurship and startups, and a theoretical qualitative research method – to be precise, desk research.

For data processing, the author has employed qualitative encoding, analysis, interpretation, generalization and elaboration. Theoretical methods, which comprise descriptive, logical and comparative analyses as well as inductive reasoning for the expert interviews and deductive reasoning for assumption testing, have been employed for qualitative data analysis.

The aim was to investigate the possibilities and barriers which social enterprises might encounter while searching for investors.

The author conducted six semi-structured expert telephone interviews following a list of questions, but at the same time there was flexibility in how and when the questions were asked, allowing space for the experts to answer on their own terms while sticking to the structure for comparison across the interviewees with a focus on the content and context of the interview.

Among the advantages of the expert interview method, the following could be mentioned: fast access to the field, a quick way of obtaining specific information, less time-consuming than many other methods.

The interview type could be classified as a combination of explorative and theory-generating interviews, which are applied as an orientation in a little investigated field with a focus on subjective aspects of experts’ knowledge, motives, and implicit beliefs to be able to compare and aggregate data.

The interaction type of the expert interviews can be identified as co-expert, conveying a semi-formal dialogue, and the style of questioning was unbiased. The questionnaire was created in February 2016, and the interviewing took place in March and April, 2016, in the Latvian language.

The experts were asked five questions, four of which were open-ended and one of which was semi-open. The questions were structured to clarify whether it is possible for social enterprises to be startups and attract investors as well as to identify the key possibilities and barriers along with the most appropriate ecosystem tools which may benefit social enterprise startups and the funding mechanisms available to them.

According to the Macmillan Dictionary an expert is “someone who has a particular skill or who knows a lot about a particular subject”, that is to say, a person who is very knowledgeable about or skilful in a particular area. The author classifies the respondents as experts since they have specific experience and requisite knowledge in the fields of social entrepreneurship and startups, researching, developing, promoting and working in these areas.

The author selected six experts in the fields of social entrepreneurship and startups. Among them are practitioners and policymakers: an Executive Director of the Social Entrepreneurship Association in Latvia, a freelance non-formal education trainer and fundraising consultant; the Head of the Board at the Latvian Startup Association and the initiator and Director of the Labs of Latvia project; the Head of RISEBA Creative Business Incubator, a lecturer and expert on startup companies and creative industries, the founder and CEO of BIORGANIK Ltd.; a curator at Startup Genome and co-founder at
Tactile Eyesight, also a strategic consultant at Social Media Mapper; the co-founder of the Latvian social enterprise startup LuDE, a CEO at ALINA LLC; the co-founder of the Latvian social enterprise startup Edurio.

According to the Latvian concept of social entrepreneurship as expressed in “The introduction of social entrepreneurship opportunities in Latvia” (2014), social enterprises can be registered in the commercial register as limited liability companies and operate like any other businesses, though it is stated that the majority of them are not sustainable enough in the present business environment. In the future, it is envisaged to give them special status as social enterprises, which will allow them to receive some benefits in state and municipal procurement as well as other financial and non-financial support. Apart from that, the Social Entrepreneurship Association (SEA) was founded in Latvia in 2015 and the pilot project of support activities was launched by the Ministry of Welfare and the financial development institution ALTUM in January 2016 and will continue up to December 2018. Then, based on the project’s results a draft law on a social entrepreneurship framework will be prepared.

A number of steps were taken for the analysis of expert interviews, including: transcription, paraphrasing, headlining, comparison, conceptualization and theoretical generalization.

4. RESEARCH RESULTS

All the experts answered positively to the first crucial question, regarding whether it is possible for a social enterprise whose primary goal is social to be a startup that attracts investors who are interested in potentially highly profitable and fast growing companies. Among the possibilities of how to make it happen, the experts outlined the following preconditions.

Firstly, a social enterprise could be potentially highly profitable and fast growing if it solves a global social and/or economic issue while offering products and/or services for a global market.

Secondly, a social enterprise has to adopt a proper business model, for instance, a hybrid social enterprise where for-profit and non-profit entities are united and there are three types of integration: embedded (social and economic activities are one and the same), integrated (social and economic activities are synergetic) and external (social and economic activities are linked only through funding). Definitely, a for-profit social enterprise model, where business cannot be separated from the social mission, that is, a product or a service that is sold, triggers social or environmental change.

Thirdly, the experts acknowledged the specific types of investors that could be attracted, that is, a new generation of so-called impact investors, who are targeting for-profits and hybrids with social missions, broadening the base of potential clients. Social entrepreneurs have to prove their dual (social and economic) value generation to investors, quantifying not only their financial results but also their social impact. Aside from this, one of the experts, who is a practitioner, noted that the key distinguishing factor in the definition of a social enterprise might be a positive social impact, but not 100% reinvestment of surpluses. Also, angel investors (high-net-worth individuals) were recommended by experts as a possible option for small and medium-sized social enterprise startups, as they typically make decisions on their own and invest in deals earlier than venture capitalists.

The second question addressed the areas of business where social enterprise startups might be potentially attractive to investors, in other words, where they see the highest return on investment (ROI), as well as social return on investment (SROI), which is an extra-financial value not reflected in conventional financial accounts but relative to resources invested. The majority of experts placed the main emphasis here not even on the particular area but on scaling for global product distribution. Apart from that, several experts indicated that specifically the healthcare industry – for example, preventive rehabilitation services, senior housing and continuing care for retired, assisted living and long-term care services and facilities – could provide global solutions to global markets. Also, IT and technology, ecology, education and logistics, and, specifically, ordering food via the Internet were mentioned by the experts as potentially attractive areas of business for social enterprises as startups. Meanwhile, work integration social enterprises (WISE) were considered by some experts as a bit less attractive due to their low competitiveness, since the work performance and productivity of their employees might be lower than at the average traditional enterprise. However, work integration social enterprises are not sector-dependent and have viable perspectives of growth and development, which was also indicated by the experts. The challenge in this case would be how to organize job coaching and occupational competence training cost-effectively so that it would not become a significant competitive disadvantage.
The next question concerned the barriers that impede social enterprises from being startups and attracting investors. Almost all the experts indicated that in most cases traditional commercial investors simply do not clearly understand the essence of social entrepreneurship as well as the value of the social impact added to the financial returns on investments. Moreover, the experts affirmed that it would take longer for social enterprises to become profitable and generate high return on investments.

The questions regarding appropriate funding possibilities for social enterprise startups and the most efficient ecosystem support mechanisms and tools could be united in one block since the experts’ responses to them complemented each other. For instance, several experts agreed that business hubs oriented toward social enterprises might be powerful ecosystem builders as they could aggregate networking opportunities and relevant expertise along with advice while offering office space and facilities at a low rent in one place. So, they could support newly created social enterprise startups through the tricky early stages. One of the core features of business hubs outlined by the experts was community orientation, as in general they are created to nurture a local network of like-minded and focused entrepreneurs, providing a place where they can work, meet, collaborate, network, learn and even have fun. As to the European experience, some business hubs are privately run for a profit, some are managed by universities, and others are run by local authorities or charities.

Aside from this, some experts suggested that seed accelerators would suit the best social enterprise startups, since they might boost intensive business trainings (3-6 months) culminating in a public pitch event or demo day when the startups could be presented to potential investors. Also, there is a highly competitive selection process ensuring that only the most motivated, talented and sustainable startups would participate in the training. However, some of the experts noted that accelerators were too aggressive and assume that an entity will be financially viable in a very short period of time, just 3-6 months, which could be quite challenging for social enterprises as it takes longer for them to become self-sufficient.

Meanwhile, several experts proposed business incubators as a helpful tool for long-term ecosystem creation (up to 2 years) for social enterprises, through which they could enjoy tailored well-structured pro bono services, mentoring addressed specifically to their needs, and premises for a rental price that could be substantially lower than the average one on the market. However, there were experts who considered business incubators quite counterproductive since they might introduce the opposite of a startup environment, which could be classified as a comfort zone with a glass house effect.

As to other funding possibilities for social enterprise startups, the experts suggested state and municipality support mechanisms in the forms of public procurement, grants, premises, pro bono services, as well as EU funds, since the social impact factor is highly valued in any EU project. At the same time, the experts warned that while applying for the abovementioned funding possibilities, these supporting mechanisms could appear quite inflexible and bureaucratic, consuming a lot of time and unable to adjust quickly to anything new.

Finally, crowdfunding was recommended by the experts as a potential source for seed and growth capital. However, raising the necessary amount of money was believed by the experts to be a quite complicated process and not generally a successful one, taking into consideration the experience of our Latvian startups, as they were not able to collect the necessary sums for their entities. Nevertheless, crowdfunding platforms were considered by the experts as a useful mechanism for analysing the results, even negative results, as they show if there is any demand for a product or service.

5. CONCLUSIONS AND RECOMMENDATIONS

Taking everything above into consideration, the author may conclude that social enterprises have the potential to be startups with the ability to attract various types of investors, especially impact and angel investors. Moreover, global social and economic solutions targeting global markets while operating in various areas of business, such as healthcare, social care, education, the environment, IT and technology, could potentially ensure the success and financial viability of social enterprise startups.

Apart from this, for-profit and hybrid business models of social enterprises could fulfill investors’ expectations of receiving financial as well as social returns on investments, benefiting both the investees (social enterprises) and the investors as well as society on the whole. Meanwhile, hubs, accelerators, and business incubators oriented toward social enterprises might provide the necessary support, promoting their development.

Furthermore, to stimulate the emergence of social enterprise startups, there should be a clear
understanding of social enterprises’ essence among investors and within the traditional finance sector. Aside from this, crowdfunding together with EU, state, and municipal financial support mechanisms could serve as additional funding possibilities, critical for seed and growth capital in the early phases of social enterprise startups.

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G-AUDI FRAMEWORK: EVALUATION OF ICT INDUSTRY IN LATVIA TO DEVELOP STRATEGIES

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Abstract

Purpose: to create a synthesised conceptual framework for evaluating the information and communication technology (ICT) industry and to illustrate application of the framework by identifying existing situations and tendencies in the ICT industry in Latvia in order to suggest development strategies for ICT enterprises and ICT policymakers.

Approach: adopted a systematic literature review method and, through the content analysis technique, analysed 158 scientific papers (only papers mentioned directly in the article are included in the references), book chapters and proceedings focused on the ICT industry. The period of the literature review: January 2000 – March 2016. Based on the analyses, a conceptual framework is developed. The main data sources for ICT industry evaluation in Latvia 2014/2015 within the created framework: public government organisation reviews and studies – Global Information Technology Report 2015 (World Economic Forum, 2015), The PREDICT 2015 Report: An Analysis of ICT R&D – the EU and Beyond (European Commission, 2015), Digital Agenda for Europe. Unlocking the ICT growth potential in Europe: Enabling people and businesses (European Union, 2013), and World Bank and Eurostat statistics about the ICT industry.

Findings: the results of the literature research revealed that the main research gap is that there are no academic, focused and holistic studies on the ICT industry in Latvia that evaluate not only the situation in the industry but also tendencies and possible development strategies for ICT enterprises and policymakers. This is a highly relevant topic and the authors have developed a wide range of possible future research directions, which shows that this topic has scientific potential. In the paper a synthesised G-AUDI framework consisting of 5 elements is proposed in order to analyse the industry, i.e., the performance level of its actors, usage, domain and impact, and the levels of these elements could also reveal the gaps in the industry’s development. Evaluation of the ICT industry in Latvia shows that the levels are close and mostly at a medium-low level, but there are gaps to fill to improve the performance of the industry in Latvia. Several possible strategies are mentioned that should be validated by experts in detailed future studies.

Value: it is one of the few up-to-date studies that have compiled trends and challenges mentioned in the scientific literature. The conceptual ICT industry evaluation framework created in the study should be further tested empirically.

Paper type – conceptual paper.

Keywords – ICT industry, ICT industry evaluation, ICT industry in Latvia, SWOT matrix

INTRODUCTION

In the last 15 years ICT has driven global development in an unprecedented way and technological progress and infrastructure development have increased access to ICT and connectivity around the world (ITU, 2015). Between 2000 and 2015 there were serious changes in the ICT industry: (1) globally 3.2 billion people were using the Internet by the end of 2015, of which 2 billion were from developing countries; (2) in 2015 there were more than 7 billion mobile cellular subscriptions compared to only 738 million in 2000; (3) global Internet penetration increased from 6.5% in 2000 to 43% in 2015; (4) the number of mobile broadband subscriptions has increased 12 times since 2007 and was used by 47% of the world’s population in 2015; (5) household Internet access grew from 18% in 2005 to 46% in 2015; (6) the proportion of the population covered by a 2G mobile-cellular network grew from 58% in 2001 to 95% in 2015 (ITU, 2015). These data show that the ICT industry is growing fast globally – but what is the situation in Latvia? According to research conducted in 6 databases, there are only two
scientific papers about the ICT industry in Latvia. One of them describes the quantitative characteristics of information society and the ICT industry in Latvia (Gulbe, 2015), and the other analyses the competitiveness of Latvia's ICT service sector, but these studies reveal only a few ICT industry indicators (Balina & Mickevica, 2012). The Central Statistical Bureau (CSB) has gathered some data about the ICT industry. Based on CSB data, the Investment and Development Agency of Latvia (2015) has concluded that the ICT industry itself comprises only 3.8% of the GDP of Latvia. But the ICT industry’s importance goes well beyond that; it is vital to: (1) meeting globalization and social challenges; (2) delivering cutting-edge science; (3) making the public sector more efficient and modernizing sectors ranging from education to energy, etc. These are the reasons why it is vitally important to research this industry. There are also global business consultancy and public government organisation reviews and studies which research specific aspects of the ICT industry on a global or European level that also include Latvia, for example, the Global Information Technology Report 2015 (World Economic Forum, 2015), The PREDICT 2015 Report: An Analysis of ICT R&D – EU and Beyond (European Commission, 2015), Digital Agenda for Europe. Unlocking the ICT growth potential in Europe: Enabling people and businesses (European Union, 2013), and World Bank and Eurostat statistics about the ICT industry. All these studies could be divided into two groups: (1) studies that explore one specific ICT industry aspect and its tendencies; (2) studies that explore many aspects but not tendencies. There are no studies that develop possible development strategies for ICT enterprises and policymakers based on an evaluation of the situation. So there is a research gap. Every study uses different ICT industry evaluation indicators and methods, but the most frequently applied evaluation tools are Porter’s 5 Forces Model and input-output analysis. This situation shows that there is a lack of tools to evaluate the ICT industry, so the aim of the authors is not only to research the ICT industry in Latvia, but also to create an evaluation framework for the ICT industry based on literature research that will not only describe the current situation but also evaluate tendencies with the aim of developing possible development strategies for ICT enterprises and policymakers.

Research aim: to create a synthesised conceptual framework for evaluating the information and communication technology (ICT) industry and to illustrate application of the framework by identifying existing situations and tendencies in the ICT industry in Latvia in order to suggest development strategies for ICT enterprises and ICT policymakers.

Research tasks: (1) determine the main dimensions for evaluating the ICT industry, create an ICT industry evaluation framework based on them; (2) illustrate application of the framework by evaluating the ICT industry in Latvia and developing possible strategies for ICT industry enterprise managers and policymakers.

Research design: (1) explore literature about the ICT industry in order to create an ICT industry evaluation framework; (2) evaluate the ICT industry in Latvia; (3) conclusions and suggestions for future research.

Research method: systematic literature review method and content analysis technique.

Research questions:
- RQ1 – What is the level of research on the ICT industry in Europe and Latvia based on the researched literature?
- RQ2 – What are the most researched trends and challenges?
- RQ3 – What are some future research ideas regarding the ICT industry in Latvia?
- By addressing different aspects of ICT industry research, the answers to these questions imply an answer to RQ4: What are the main dimensions for ICT industry evaluation (sub-elements and elements)?

Research basis: literature sources from 6 databases – Scopus, ScienceDirect, Sage Journals, EBSCO Academic Search Complete, Emerald, and Web Science – as well as business consultancy and public government organisation reviews and studies. In the research, mainly secondary sources (scientific papers, books, etc.) are used to create an ICT industry evaluation framework, while business consultancy and public government organisation reviews and studies are used to create an evaluation of the ICT industry in Latvia.

Theoretical aspects of the ICT industry
The ICT industry has become significant in the regional economic structure during the last two
decades through its increasing impact on other industries (Hudec & Sebova, 2012). Zoroja (2015) found that ICT plays an important role in the competitiveness of European countries on a global level, while Garcia-Muniz & Vicente (2014) maintain that the ICT industry is the key instrument for the development of an economy. Chand (2005) has even written that ICT is a survival tool in a social, economic, political and military sense. Mathur (2009) has asserted that the difference between information and communication technology reveals that information technology refers to computer software, computer services and hardware, while communication technology describes telecommunications equipment.

There are many definitions of the ICT industry but one of the elements that could provide the most accurate view are standards on industry classification. For example, the OECD stated that the “ICT industry is a combination of manufacturing and services industries that capture, transmit and display data and information electronically” (OECD, 2003:81). This definition of the ICT industry is also consistent with standard international classification of its activities (ISIC Rev. 3):

(1) “Manufacturing: 3000 - office, accounting and computing machinery; 3130 - insulated wire and cable; 3210 - electronic valves and tubes and other electronic components; 3220 - television and radio transmitters and apparatus for line telephony and line telegraphy; 3230 - television and radio receivers, sound or video recording or reproducing apparatus and associated goods; 3312 - instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process equipment; 3313 - industrial process equipment.

(2) Services: 5150 - wholesaling of machinery, equipment and supplies; 7123 - renting of office machinery and equipment (including computers); 6420 - telecommunications; 72 - computer and related activities” (OECD, 2003: 81).

This definition concentrates on the characteristics of the industry’s products, but it was revised again in 2007. The new definition of the ICT sector is as follows: “the production (goods and services) of a candidate industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display” (OECD, 2007: 15). The list of ICT industries (ISIC Rev. 4) that meet these conditions are as follows:

(1) “ICT manufacturing industries: 2610 - manufacture of electronic components and boards; 2620 - manufacture of computers and peripheral equipment; 2630 - manufacture of communication equipment; 2640 - manufacture of consumer electronics; 2680 - manufacture of magnetic and optical media.

(2) ICT trade industries: 4651 - wholesale of computers, computer peripheral equipment and software; 4652 - wholesale of electronic and telecommunications equipment and parts.

(3) ICT services industries: 5820 - software publishing; 61 - telecommunications; 6110 - wired telecommunications activities; 6120 - wireless telecommunications activities; 6130 - satellite telecommunications activities; 6190 - their telecommunications activities; 62 - computer programming, consultancy and related activities; 6201 - computer programming activities; 6202 - computer consultancy and computer facilities management activities; 6209 - other information technology and computer service activities; 631 - data processing, hosting and related activities; web portals; 6311 - data processing, hosting and related activities; 6312 - web portals; 951 - repair of computers and communication equipment; 9511 - repair of computers and peripheral equipment; 9512 - repair of communication equipment” (OECD, 2007:15).

The new view differs from the previous view in the following ways: (1) the scope of the ICT industry is narrowed down by excluding electronic processing to detect, measure and/or record physical phenomena or control a physical process; (2) some categories are more specific.

In this research the OECD (2007) definition will be used as it is the latest OECD ICT industry definition and is widely used by other organisations, for example, the European Commission. It should be noted that this definition provides only a general view for the authors on this industry and will be used in framework development.

Research methodology

The research is based on the theoretical research method – the adapted systematic literature review method – and the content analysis technique regarding scientific literature about the ICT industry in
order to create a holistic ICT industry evaluation. Based on the analyses a conceptual model is developed. Business consultancy and public government organisation overviews and studies on the ICT industry are applied to demonstrate how to apply this framework by evaluating the situation and perspectives in Latvia. The research design is shown in Figure 1.

**Figure 1. Logical schema of the research**

Phase 1 – literature review divided into 5 research stages: (1) to research literature about the ICT industry; (2) to select literature specifically about the ICT industry; (3) to exclude duplicates; (4) to analyse selected papers; (5) to create an ICT industry evaluation framework.

The researched literature was written between January 2000 and March 2016. The first three research stages are shown in detail in Table 1.

### Table 1

<table>
<thead>
<tr>
<th>Sources</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sources in which “ICT industry” is mentioned (in the title and/or abstract)</td>
<td>Sources specifically about the ICT industry</td>
<td>Unique sources</td>
</tr>
<tr>
<td>Scopus</td>
<td>258</td>
<td>113</td>
<td>158</td>
</tr>
<tr>
<td>ScienceDirect</td>
<td>14568</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Sage Journals</td>
<td>4386</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>EBSCO Academic Search Complete</td>
<td>37</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Emerald</td>
<td>4159</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Web of Science</td>
<td>1694</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td>25102</td>
<td>262</td>
<td></td>
</tr>
</tbody>
</table>

Overall, 158 papers and proceedings were analysed, but only those mentioned in this article directly are referenced.

After Stage 3, selected sources were analysed in a systematic review using a 3-step approach (Boiral, 2012): (1) development of a review protocol; (2) data extraction; (3) information synthesis. The development of a protocol is important for collecting answers to RQ1-RQ3. In the review process the main factors for analysis were: (1) geographical perspective of the paper; (2) ICT industry trends and challenges included; (3) ICT industry sub-elements included; (4) research gaps described; (5) research aim and research results.

The fifth stage of the literature review is the creation of an ICT industry evaluation framework based on the main ICT industry indicators according to the researched literature using both deductive and inductive approaches (detailed in Section 1.2). In Phase 1 of this stage, RQ4 is answered: What are the main dimensions (elements) for ICT industry evaluation based on the main ICT industry indicators found in the literature review?

Phase 3: conclusions (on the situation and perspectives in the ICT industry in Latvia and on the level of research in this area) and suggestions for future research and development with regard to the ICT industry in Latvia.

1. RESULTS OF THE LITERATURE RESEARCH

1.1. ICT INDUSTRY LITERATURE

Based on the content analysis conducted, the paper provides an answer to RQ1 – what is the level of research on the ICT industry in Europe and Latvia based on the researched literature? According to the literature research it may be concluded that the level of research on the ICT industry in Europe is appropriate, since 69 of 158 researched literature sources were directly related to European countries, while only 24 sources (for example in Broeders & Hampshire, 2013; Misuraca, Broster & Centeno, 2012; Narulaa & Santangelob, 2009; Ballon & Van Heesveide, 2011; Dimelis & Papaioannou, 2011; Rohman, 2013; Jorgenson & Vu, 2016; Luhan & Novotna, 2015; Savulescu, 2015; Rohbeck, 2010) were about more than one European country. Only 2 research papers about the ICT industry in Latvia were found – Gulbe (2015), Baltina and Mickevica (2012). This situation shows that there is a lack of focused studies about the ICT industry in Latvia. It should be noted that studies mainly focus on exploring some specific aspects of the ICT industry, but there is a lack of scientific papers evaluating the ICT industry and creating new frameworks to evaluate it. The authors support the opinion that studies should not only explore something new but also provide contributions regarding possible practical implications. The authors consider that evaluation of the ICT industry should explore not only the overall situation and tendencies but also strategies for ICT industry enterprises and policymakers.

The literature review also provides an answer to RQ2 – what are the most researched trends and challenges? There are studies about different ICT industry trends and challenges, and to sum up, in the researched literature, the focus is mainly on different trends and challenges in the ICT industry. Additionally, there is a well-noted stream of research about the ICT industry’s impact. A summary of the most frequently researched and described challenges and trends can be found in Table 2.

<table>
<thead>
<tr>
<th>Trends and challenges described in the researched literature</th>
<th>Challenges related to external elements</th>
<th>Impact of the industry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clustering and clusters</strong> (Wang, Lin &amp; Li, 2010; Lucas, Sands &amp; Wolfe, 2009; Koski, Rouvinen &amp; Yla-Anttila, 2002), <strong>alliances</strong> (Kum, Chang &amp; Atkinson, 2008; Chiaroni &amp; Chiesa, 2008)</td>
<td><strong>Sustainability and energy – impact on CO2</strong> (Zhang &amp; Liu, 2015), <strong>electricity consumption</strong> (Salahuddin &amp; Alam, 2016), <strong>green ICT</strong> (Peng, 2013), <strong>energy demand</strong> (Schulte, Welsch &amp; Rexhauer, 2016), <strong>sustainability</strong> (Arushanyan et al., 2015)</td>
<td><strong>Impact on the economy, such as productivity</strong> (Iammarino &amp; Jong-Lasino, 2015; Dimelis &amp; Papaioannou, 2011; Inklaar, O’Mahony &amp; Timmer, 2005; O’Mahoney &amp; Robinson, 2003), <strong>impact on governance and policymaking</strong> (Misuraca, Broster &amp; Centeno, 2012), <strong>contribution to</strong></td>
</tr>
<tr>
<td><strong>Innovation and innovation performance</strong> (Wang, Lin &amp; Li, 2010; Sun &amp; Du, 2011; Lin et al., 2011; Gao, Guo &amp; Guan, 2014; Figueiredo &amp; Brito, 2012; Maurseth &amp; Frank, 2009)</td>
<td><strong>ICT industry globalization</strong> (Chen &amp; Lin, 2004)</td>
<td></td>
</tr>
<tr>
<td><strong>Networks and linkages</strong> (Sun &amp; Du, 2011; Liao &amp; Wei, 2013; Wei, Liefner &amp; Miao, 2011; Rohrbeck, 2010)</td>
<td><strong>ICT ecosystem</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Convergence</strong> (Hacklin, Marx &amp; Fahimi, 2009; Xing, Ye &amp; Kui, 2011; Mancebon &amp; Lopez-Pueyo, 2012)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Grant, 2004; Lopez-Pueyo & Mancebon, 2010)
The impact of knowledge management / sharing / transfer, learning, intellectual capital on ICT industry firm performance (Shehata, 2015; Cheung, 2010; Calabrese, Costa & Menichini, 2013; Jang, Yang & Hong, 2014; Im & Yang, 2014)
Total quality management (Khanam, Ztlib & Siddiqui, 2015; Talib, Rahman & Akhtar, 2013)
Business insolvency (Yang et al., 2015), growth capacity (Li & Chen, 2013), foreign investments in ICT (Abbas-Kazmani & Manarvi, 2009), resilience (Holm & Ostergaard, 2015)
ICT security (Chand, 2005), labour standards in the industry (Ferus-Comelo, 2008), ethics (Lucas & Mason, 2008)
Gender-related aspects, such as female professionals’ perceptions of working in the ICT industry (Timms et al., 2008; Crump, Logan, McIlroy, 2007), pay equity (Byrnes & Staehe, 2011)
Forecasting (Meade & Islam, 2015), future skills in the ICT industry (Leppimaki & Meristo, 2006)
Industry competitiveness (Halkos & Tzeremes, 2007; Doucek et al., 2011; Balina & Mickevica, 2012)

The research conducted revealed that there are many research gaps with regard to the ICT industry in Latvia, based on the conclusion that there are only two focused studies about the ICT industry in Latvia. Some possible objectives for future research (RQ3 – what are some future research ideas regarding the ICT industry in Latvia?):

- To research challenges in the ICT industry in Latvia directly, for example, to research challenges which are explored in the researched literature, such as (1) clustering and clusters in the ICT industry in Latvia, (2) innovation and innovation performance in the industry, (3) networks and linkages in the industry, (4) convergence in the industry, (5) productivity growth, efficacy, employment performance in the industry, (6) the impact of knowledge management / sharing / transfer, learning, intellectual capital on ICT industry firm performance, (7) business insolvency in the industry, (8) industry growth capacity, (9) foreign investments in ICT, (10) ICT security, (11) labour standards and ethics in the industry, (12) entry barriers in the industry, (13) gender-related aspects, such as female professionals’ perceptions of working in the ICT industry, (14) industry competitiveness, (15) forecasting, etc.
- To research the ICT industry’s impact: (1) social, (2) economic, etc.
- To research external challenges and tendencies, for example, (1) sustainability and energy consumption, (2) ICT industry globalization, (3) the ICT ecosystem, (4) problems with ICT affordability, application, (5) effect of patents on the ICT industry, (6) the impact of different business cycles on the ICT industry, etc.

The authors have concluded that even though there are many studies on the ICT industry related to management and business, there is a lack of studies that show how to evaluate the ICT industry overall
and even less recommendations on how to conceptualise evaluation results in strategies. This is a highly relevant topic and the wide range of possible future research directions proves that it has scientific potential.

1.2. THE ICT INDUSTRY EVALUATION FRAMEWORK G-AUDI

Based on analysis and synthesis of ICT industry research trends and characterisation of sub-elements in studies, the authors have compiled more than 50 different ICT sub-elements. In this section an answer is provided for RQ4: what are the main dimensions for ICT industry evaluation (sub-elements and elements)? The most recently mentioned sub-elements in literature according to the content analysis conducted are ICT use, ICT enterprises, ICT’s impact, and different environmental factors, challenges and problems in the ICT industry. Development of the framework’s main elements was part of the content analysis coding. It was not a linear process, since after basic code (sub-element) determination, pre-defined organisational code groups were selected (deductive approach), inspired by element from Porter’s 5 Forces Model (supplier power, buyer power, competitive rivalry, threat of substitution, threat of new entry) as well as elements from the input-output analysis of the ICT industry in the reviewed literature (for example, ICT infrastructure, ICT adoption, impact on the economy, impact on society, etc.). Then all the basic codes were divided into organisational code groups, new code groups for the rest of the sub-elements were created, and the most similar groups were merged and redefined as necessary (inductive approach). The basic code grouping in organisational code groups was performed independently by two researchers to ensure inter-coder reliability (Duriau, Reger & Pfarrer, 2007). A few disagreements were resolved through a discursive alignment of interpretation and definition of organisational code groups. So the organisational code groups or main elements of the framework are: gaps, actors, usage, domain, impact of the industry and its products/services. It should also be noted that according to the authors’ conception, there are connections between all the main framework elements – actors, usage, domain and impact – while gaps reveal if there are differences between the performance levels of these elements. See Figure 2.

![Figure 2. G-AUDI – ICT industry evaluation framework](https://example.com/figure2)

To use this framework, it is important to identify the level of element performance (through sub-element level evaluation). All elements and some optional sub-elements are described and explained in Table 3.

<table>
<thead>
<tr>
<th>Elements and sub-elements of the G-AUDI framework</th>
<th>Some of the authors who mentioned the elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actors</strong> Characterize actors and agents, their roles in the industry, and evaluate the level of actors’ performance.</td>
<td>ICT firms – major “winners”, number of businesses, size and types of firms, innovation and R&amp;D, ICT clusters, ICT supply, sustainability, networks, strategic alliances, collaboration, suppliers, clients, image of the industry, etc. Costello, Chibeluashi &amp; Sloane, 2007; Im &amp; Yang, 2014; Jang, Yang &amp; Hong, 2014; Neumann, 2006; Martinovic, Pozega &amp; Pudic, 2014; Chaminade &amp; Plechero, 2015; Lee, Kim &amp; Park, 2009; Wang &amp; Lin, 2008; Lida, 2016; Koski, Rouvinen &amp; Yla-Anttila, 2002; Yu, et al., 2008; Narulaa &amp; Santangelo, 2009</td>
</tr>
<tr>
<td><strong>Usage</strong> Characterize usage of ICT industry products and services. Evaluate the level of the usage.</td>
<td>ICT products/services, ICT use, adoption (individual, business, government), ICT spending, outsourcing, demand, ICT diffusion, ICT deployment barriers, etc. Iammomarino &amp; Jona-Lasino, 2015; Garcia-Muniz &amp; Vicente, 2014; Costello, Chibeluashi &amp; Sloane, 2007; Acharya, 2016; Schulte, Welsch &amp; Rexhauser, 2016; Zoroja, 2015; Mathur, 2007; Ting &amp; Rui, 2008, Qin, 2009; Lee et al., 2014; Lee, Yang &amp; Lee, 2015; Ziaie, 2013</td>
</tr>
</tbody>
</table>
Characterize the environment of the industry. Evaluate the support level of the domain. Different sub-tools could be used, for example, PESTL or Porter’s 5 Forces Model, etc.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Impact on the economy – productivity, percentage of ICT in the GDP; impact on society, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Characterize the level of the economy, social aspects, and the environment.</td>
</tr>
</tbody>
</table>

It should be noted that the sub-elements mentioned in Table 3 could also be categorised under other elements and there could be other sub-elements. In this research, this framework will be applied for the first time, but the authors believe that the framework should also be evaluated by experts and professionals in future studies. The authors believe that the five basic elements of the model could be used to research other industries and a smaller market unit as well, but this idea should be researched as well.

Not only the identification of each element and sub-element is important but also the tendencies, which could help to reveal the gap’s increase or decrease.

The framework could help researchers to evaluate the industry and explore existing gaps. The element level identified could reveal different situations in the industry; see Table 4.
Table 4

Results of the G-AUDI framework
Performance of the framework elements

1. Concerted – positive – the levels of the elements are high, which means that the performance of the actors, users, and domain are coherent and the impact is also high. But even if there is a perfect situation, this doesn’t rule out improvements or development.

2. Concerted – neutral – the levels of all the elements are medium, which means that the situation is coherent, but the performance could improve.

3. Concerted – negative – the levels of all the elements are low, which means that the performance and results of the industry show that its potential is not used.

Disconcerted performance and results of the framework elements

Disconcerted – if there are different levels for the factors or some elements are at the same level, there are problems or unused potentialities – there could be improvements according to the situation.

Also, the level of the elements and sub-elements demonstrates where the main problems are.

It should be noted that the absolute variants of the results in the real situations will always have some disconcerted and concerted elements, so there will be gaps. The situation is better if the elements are closer and at a higher level, and also, if all the elements are on the same level, there could be gaps.

An absolute concerted variant will be rare, because there are always some disconnections between elements, and if the performance and results of the industry are concerted and positive, there could still be gaps and room for improvement. So, after Stage 1 – identification of sub-elements and their levels as well as the element level – comes Stage 2: identification of situation-positive aspects and gaps as well as possible strategies for several industry actors. In Stage 2, the authors recommend applying a SWOT matrix. Regarding the application and the results for the ICT industry situation in Latvia, see Section 2.

2. THE ICT INDUSTRY IN LATVIA

In this section, the authors evaluate the ICT industry in Latvia, applying the G-AUDI framework. This process is divided into several steps: (1) selection of sub-elements; (2) identification of sub-element levels; (3) identification of element levels; (4) evaluation of sub-element tendencies; (5) identification of the situation and gaps and an illustration of framework-based development strategy creation by applying a SWOT matrix.

2.1. EVALUATION OF THE ELEMENTS: G-AUDI FRAMEWORK

The evaluation of the ICT industry is based on the G-AUDI framework. For every framework element a group of 5 experts (2 – ICT researchers, 3 – ICT company CEOs) with more than 5 years of experience with the ICT industry assessed each potential sub-element from 0.1 (not important) to 1 (important). All elements with an average score above 0.6 were applied, that is, those elements that are more important than not important. The levels of the sub-elements influence the level of the elements. The levels of the sub-elements and tendencies are evaluated by tertiary data from public and private-
sector reviews and statistics. The sub-element level is established by assessing if the element indicator of Latvia in the tertiary data source is higher, lower or on the same level as the average in the group of countries where Latvia is included according to the review. To identify the tendency, the authors have compared the data on industry performance with the previous period. See the evaluation in Table 5.

<table>
<thead>
<tr>
<th>Level</th>
<th>Sub-elements</th>
<th>Sub-level</th>
<th>Tendency</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain of environment</td>
<td>Medium-low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Internet &amp; telephony competition</td>
<td>High</td>
<td></td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>5. Added value</td>
<td>Low</td>
<td>+</td>
<td></td>
<td>Eurostat, 2012; CSB, 2016</td>
</tr>
<tr>
<td>Actors</td>
<td>Medium-low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Importance of ICTs to the government’s vision</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>1.2. Government Online Service Index</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>2.1. Firm-level technology absorption</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>2.2. Capacity for innovation</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>2.4. Business-to-consumer Internet use</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>2.5. Extent of staff training</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.1. Mobile phone subscriptions/100 pop.</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.2. Individuals using Internet %</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.3. Households w/ personal computer %</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.4. Households w/ Internet access %</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.5. Fixed broadband Internet subs/100 pop.</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>3.7. Use of virtual social networks</td>
<td>+</td>
<td>+</td>
<td></td>
<td>World Economic Forum, 2015; 2014</td>
</tr>
<tr>
<td>Usage</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Elements and sub-elements of the G-AUDI framework
The results show that the levels of the elements are close and mostly at a medium-low level, which means that the situation in the industry is almost concerted, but there are gaps to fill in order to improve the performance of the industry in Latvia. However, most of the elements show positive trends toward improvement. In the next section the authors use a SWOT matrix to demonstrate how to develop framework-based strategies.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Medium: low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social impact</td>
<td>Medium</td>
</tr>
<tr>
<td>1.1. Impact of ICTs on access to basic services</td>
<td>+</td>
</tr>
<tr>
<td>1.2. Internet access in schools</td>
<td>+</td>
</tr>
<tr>
<td>1.3. ICT use &amp; gov’t efficiency</td>
<td>+</td>
</tr>
<tr>
<td>1.4. E-Participation Index</td>
<td></td>
</tr>
<tr>
<td>2. Economic impact</td>
<td>Low</td>
</tr>
<tr>
<td>2.1. Impact of ICTs on new services &amp; products</td>
<td>+</td>
</tr>
<tr>
<td>2.2. ICT PCT patents, applications/million pop.</td>
<td>+</td>
</tr>
<tr>
<td>2.3. Impact of ICTs on new organizational models</td>
<td>-</td>
</tr>
<tr>
<td>2.4. Knowledge-intensive jobs, % workforce</td>
<td>+</td>
</tr>
<tr>
<td>2.5. Employment in the ICT sector</td>
<td></td>
</tr>
<tr>
<td>2.6. ICT sector value added share of GDP</td>
<td></td>
</tr>
</tbody>
</table>
2.2. SWOT MATRIX

To demonstrate how to create strategies based on the framework results, the authors have developed possible development strategies for policymakers and ICT enterprise managers in Latvia, applying the most frequently applied method – the SWOT matrix. To create a SWOT matrix, the authors have developed a 4-stage process: (1) compilation of all possible SWOT factors; (2) factor evaluation based on the adaptable methodology described by Jurevicius (2013) (strengths and weaknesses are evaluated by factor importance in the industry from 0.1 (not important) to 1 (important), while opportunities and threats are evaluated through a 3-stage process: (a) evaluation of the possible influence of the factor (0.1 – no influence; 1 – great influence), (b) possibility (1 – small possibility to 3 – great possibility), (c) multiplication of (a) and (b); (3) application of the 6 main factors in every SWOT group; (4) development of strategies. The data source for strengths and weaknesses is the previously developed G-AUDI framework, while opportunities and threats are based on Digital Agenda for Europe. Unlocking the ICT growth potential in Europe: Enabling people and businesses (European Union, 2013). See Table 6 for the SWOT matrix.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Business and innovation environment</td>
<td>W1 Infrastructure</td>
</tr>
<tr>
<td>S2 Individual usage</td>
<td>W2 Policy and regulatory environment</td>
</tr>
<tr>
<td>S3 Skills</td>
<td>W3 Business usage</td>
</tr>
<tr>
<td>S4 Affordability</td>
<td>W4 Government usage</td>
</tr>
<tr>
<td>S5 Social impact</td>
<td>W5 Economic impact</td>
</tr>
<tr>
<td>S6 Competition</td>
<td>W6 Public funding, ICT R&amp;D</td>
</tr>
</tbody>
</table>

Table 6

For policymakers and ICT organisations in Latvia:
- Evaluate and implement the new EU regulations and directives and establish institutional arrangements and coordination mechanisms to drive transformation (O4; S3)
- Support for the supply side (O2; S6)
- Capture part of the global opportunity and promote a skilled workforce in close partnership with the private sector and academic sector (O1; S3)

For ICT enterprises in Latvia:
- Create new products and services for which the EU has significant strength in demand and capability (O6; O5; S1)
- Use a healthy business and innovation environment to attract investments and funding (O3; S1)
- Increase incentives to innovate and the chance to use new business models (O6; S2; S6)

For policymakers and support organisations in Latvia:
- Facilitating a regulatory environment (O2; O6; W2)
- Dealing with funding and finance issues by improving infrastructure and regulations / policy (O3; W1; W2)
- Putting the right investment conditions in place to stimulate ICT entrepreneurs and infrastructure (O3; W1)
- The public sector moving more activities online – leading by example (O6; W4)
- Creating a common ICT strategy in Latvia (O2; W2)
- Promoting private-sector use of ICT and increasing new technology absorption capabilities (O1; W3; W4)

For ICT enterprises in Latvia:
- Invest in infrastructure and capacity improvements appropriate for the new wave of requirements (O2; W1)
Threats
T1 Negative transformations in the EU and/or global economics and technology
T2 New EU/global barriers (political, educational, social, organisational)
T3 Decrease in competitiveness
T4 Digital desert in the EU (the EU’s slow economic growth, keeps service markets fragmented)
T5 Decrease in willingness to adopt and use new ICT in the EU
T6 Security issues (privacy issues, EU and global security issues)

For policymakers and support organisations in Latvia:
• Build trust among users of ICT applications – information security and user privacy (T6; S3)
• Cooperation with other EU countries to create a single local digital and service market (T4; S1; S6)

For ICT enterprises in Latvia:
• If the EU becomes a digital desert, use business and an innovative environment to develop new, innovative solutions for growth and survival (T4; S1)
• Develop and improve products that will also be relevant in an economic downturn (T1; S1)

For policymakers and support organisations in Latvia:
• Aggregating demand by removing barriers (T2; W2)
• Stimulate local demand and usage (T1; W3; W4)
• Stimulate private funding in ICT R&D (T1; W6)
• Stimulate knowledge-intensive jobs (T2; W5)

For ICT enterprises in Latvia:
• Diversify target markets and products to decrease potential risks (T1, T2, T4, T6; W5)
• ICT integration with other technologies (T1, T2, T4, T6; W5)

Due to the paper’s length limitation, strategies are not detailed, described and justified. The authors note that the strategies described in this section are not verified by experts and should be evaluated and developed in future research. In this case, strategies are developed with the main aim of demonstrating how the framework created could be applied.

CONCLUSIONS
The paper explores 4 research questions: (RQ1) What is the level of research on the ICT industry in Europe and Latvia based on the researched literature? (RQ2) What are the most researched trends and challenges? (RQ3) What are some future research ideas for the ICT industry in Latvia? (RQ4) What are the main dimensions for ICT industry evaluation (sub-elements and elements)? These questions are addressed by conducting a systematic literature review and developing a conceptual model of ICT industry evaluation. At the end of the paper the framework created is applied to evaluate the ICT industry in Latvia and to illustrate the framework’s application.

To sum up, according to the literature research it could be concluded that the level of research on the ICT industry in Europe is appropriate, while the main research gap is that there are no focused and holistic studies on the ICT industry in Latvia that evaluate not only the current situation in the industry but also describe tendencies. The most frequently researched trends and challenges in the literature could be divided into three groups: challenges for the industry, challenges related to external elements, the impact of the industry.

The authors have also concluded that even though there are many studies about the ICT industry related to management and business, there is a lack of studies that show how to evaluate the ICT industry overall and even less recommendations on how to conceptualise evaluation results in strategies. This is a highly relevant topic and the large range of possible future research directions proves that it has scientific potential:
• To research challenges in the ICT industry in Latvia specifically, research challenges that are explored in the researched literature, such as (1) clustering and clusters in the ICT industry in Latvia, (2) innovation and innovation performance in the industry, (3) networks and linkages in the industry, (4) convergence in the industry, (5) productivity growth, efficacy, employment performance in the industry, (6) the impact of knowledge management / sharing / transfer, learning, intellectual capital on
ICT industry firm performance, (7) business insolvency in the industry, (8) industry growth capacity, (9) foreign investments in ICT, (10) ICT security, (11) labour standards and ethics in the industry, (12) entry barriers in the industry, (13) gender-related aspects, such as female professionals’ perceptions of working in the ICT industry, (14) industry competitiveness, (15) forecasting, etc.

- To research the ICT industry’s impact: (1) social; (2) economic, etc.
- To research external challenges and tendencies, for example, (1) sustainability and energy consumption, (2) ICT industry globalization, (3) the ICT ecosystem, (4) problems with ICT affordability, application, (5) the effect of patents on the ICT industry, (6) the impact of different economic cycles on the ICT industry, etc.

The authors concluded that the ICT industry could be evaluated according to the performance level of its actors, usage, domain and impact, and that the levels could reveal the gaps in the industry’s development. The authors have created a G-AUDI framework to help evaluate the ICT industry based on these elements. Evaluation of the ICT industry in Latvia showed that the levels of the elements are close and mostly at a medium-low level. Most of the elements show positive trends toward improvement. This means that the situation in the industry is almost concerted, but there are gaps to fill in order to improve the performance of the industry in Latvia. The G-AUDI framework and the results of its application should be evaluated by experts and professionals. It should be noted that like many evaluation models, it is subjective and does not have the purpose of exact indication.

The theoretical contribution of the article is as follows: (1) it is one of the few up-to-date studies in which trends and challenges of the ICT industry mentioned in the scientific literature are compiled; (2) based on the literature review, a new framework for ICT industry evaluation is created, and this G-AUDI framework should be evaluated by experts and tested empirically in future studies.

Limitations. This study has several limitations, for example: (1) the paper is conceptual, so empirical work is therefore needed to validate the model; (2) the framework is developed based on 158 papers from 6 databases – Scopus, ScienceDirect, Sage Journals, EBSCO Academic Search Complete, Emerald, Web Science – from a limited time frame: January 2000 – March 2016; (3) the sub-elements applied in the evaluation of the ICT industry in Latvia was selected by only 5 experts; (4) the effectiveness and usefulness of the framework has not been evaluated by the experts; (5) strategies in the SWOT matrix were developed subjectively to demonstrate how the framework created works, the strategies lack additional justification and validation.

Future work. In future research more ICT industry actors should be involved to evaluate the framework created and its elements in order to suggest the most appropriate sub-elements and to evaluate the overall usefulness of the framework. Also the strategies proposed in this research should be described in more detail and evaluated and validated by experts. The illustration of the framework application to evaluate the ICT industry in Latvia in order to create strategies in this paper is not sufficient to make conclusions on the usefulness of the framework. There is a need for further research, whereas the framework could be used further as a tool to evaluate the situation of the ICT industry. This could be done, for example, with empirical tests. The authors hope that this article will stimulate a scholarly dialog and future studies about the evaluation of the ICT industry.

REFERENCES


THE COMPETITIVE ABILITY OF LATVIAN EXPORT: CURRENT SITUATION AND PROSPECTS

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Abstract

Purpose: Analysis of the competitive ability of Latvia's exports is a most relevant subject in light of Latvia's negative foreign trade balance. The aim of this study is to analyse the competitive ability of Latvia's exports.

Methods: The Herfindahl–Hirschman Index was calculated to establish the diversification level of export markets, and the method developed by G. Lafay was used to determine the most competitive products; the market positions of exported goods were appraised based on the Boston matrix. Tools developed in the interactive Trade Map system were employed for the study.

Results: The most competitive Latvian products as well as the Latvian export products with the greatest potential on the world market have been established in this article.

Application: The results of this study may be useful as reference points in developing Latvia’s trade policy and determining priority sectors in Latvia to ensure they are supported and to encourage their development.

Keywords: export, Lafay index, Boston matrix, concentration of export markets, competitive products

1. INTRODUCTION

Presently, the development of foreign economic ties is characterized by increased competition between countries. Countries are striving to increase the competitive ability of companies and goods or services developed by companies, since this contributes to the growth of national exports. Export growth is especially important for Latvia because it has a negative balance of trade. However, according to a number of studies (Bandevica, Stikane, 2012), policy development should not only be aimed at increasing the export growth rate, but also, to an even greater degree, at increasing national competitive ability in the long run. Export growth based only on trading in low-cost goods cannot improve a country's welfare on a long-term basis. Policies must be aimed at furthering exports' competitive ability through production of more complex products, new technologies and innovation and through improvement of human capital (Bandevica, Stikane, 2012).

From this perspective, evaluation of the current position of Latvia's exports, the competitive ability of goods exported by Latvia and their prospects on world commodity markets is relevant and important from a practical point of view.

The aim of this study is to analyse the competitive ability of goods exported by Latvia and to evaluate their market positions on world commodity markets.

To attain this goal one must complete the following tasks:

1. determining factors that affect the competitive ability of national exports
2. analysis of the existing evaluation methods of a country's trade competitiveness
3. evaluation of the competitive ability indicators of national exports

The method proposed by G. Lafay was used in this study, the Herfindahl–Hirschman Index was calculated and the market position of exported goods was assessed based on the Boston matrix.

Data from the Central Statistical Bureau of the Republic of Latvia, Eurostat, and the interactive database of worldwide trade statistics Trade Map was used as an information base; some data was obtained from experts, news agencies and the Internet.

This study made use of data on research on the subject of foreign trade development and integration of Latvia into the global economy conducted by the Ministry of Economics of the Republic of Latvia, the Bank of Latvia, Riga Technical University, and the Investment and Development Agency of Latvia.
(LIAA) as well as data on the subject of competitiveness of exports carried out by the researchers I. Gurova, I. Tochitskaya, Bandevica, Stikane, etc.
The theoretical and methodological basis of this study comprises scientific research on the matters of foreign trade, evaluation of competitiveness of national exports, international integration, and the economics of EU member states.

2. THEORETICAL ASPECTS OF THE COMPETITIVE ABILITY OF EXPORTS
Competitive ability as an economic notion denotes the functional outcome of involvement of numerous competition factors on different levels and segments of the market. The designation "competitive ability" itself indicates that it is an ability to compete or contend in the first place (Poliakova, 2010). As J. Lobanova (2011) notes, the determinant attribute of competitive ability is the fact that it is a multilevel notion. M. Gelvanovsky (2006), in his article "Competitive Ability on Micro, Meso and Macro Level", also points out the multileveled nature of competitive ability. In his opinion "on different levels of the national economy the notion of "competitive ability" is characterised by different criteria, and based on this it must be analysed and evaluated in various ways". In addition, on the micro level goods are the subjects of competition; on the meso level the subjects are individual enterprises, firms, and industry-specific and cross-industry complexes; and on the macro level the subjects are countries' national economies (Gelvanovsky, 2006). As noted by A. Grunichev (2009), each level is a system of interrelated components which in turn are defined by the subsystems on lower levels. One should also take into consideration that at this point no uniform understanding of levels of competitive ability exists. The authors of this study believe that a level is defined by competing subjects with similar characteristics of competitive ability.

G. Poliakova (2010) stresses that competitive ability as a term should not be considered outside its relation to the object, which most often is a product, a firm, an industry, a region or a country, i.e. in the understanding of the authors of this article the subject of competition. The task of analysing the competitive ability of exports is a difficult one, since exports as a subject of research are characterised by multilevel competitive ability. Regardless of the fact that the authors view the micro level (goods) as the primary one, the competitive ability of exports in general cannot exist without meso and macro level competitive ability, and, importantly, the basis for the competitive ability of exports is set on the macro level.

T. Shakleina (2002) treats the competitive ability of a country as a synthetic indicator, which includes the competitive ability of a product, its manufacturer, and the competitive ability of the industry, and characterises the position of a country on the global market.

Michael Porter introduces his very own notion of competitive ability in his theory. He indicates that regardless of the increasing significance of globalisation, national competitive ability is defined by a combination of factors depending on specific local conditions (Porter, 2004). From M. Porter's standpoint national competitive ability in particular determines the success or the failure of specific branches of manufacturing as well as the country's role in the global economy (Porter, 2004). This same idea is further developed by M. Gelvanovsky (2006), who mentions that the foundation for development of competitive ability on all three levels (micro, meso and macro) is laid on the macro level.

R. Fathutdinov (2000) on the other hand defines the competitive ability of all levels as external factors of a product's competitive advantages. In the opinion of R. Fathutdinov (2000) increase in competitive ability on the level of a country, industry, region and organisation requires the issue of production with better use of one's potential compared to competitors.

The aforementioned contradictions in opinions of different authors only corroborate the cross impact and correlation among all levels of competitive ability. This correlation is reflected in the evaluation of national competitive ability, which depends directly on the competitive ability of exported goods, the competitive ability of companies manufacturing and exporting such goods, and the competitive ability of the country, which ensures foreign trade regulation.

The authors of this article have summarized the factors influencing the competitive ability of exports based on analysis of literature and have grouped these factors into macro, meso and micro levels (see Table 1).
### Table 1

**Factors determining the competitive ability of exports** (prepared by authors)

<table>
<thead>
<tr>
<th>Factor level</th>
<th>Factor</th>
<th>Authors who note the importance of the factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro level</td>
<td>High quality of products</td>
<td>Hummels &amp; Klenow (2005); Hallak &amp; Sivadasan (2009); Lederman and Maloney (2009); Negrea (2015)</td>
</tr>
<tr>
<td></td>
<td>Product value</td>
<td>Negrea (2015); Hummels &amp; Klenow (2005)</td>
</tr>
<tr>
<td></td>
<td>Product type and structure</td>
<td>Grossman and Helpman (1991); Golikova et al. (2012); Negrea (2015); Gelvanovsky (2006)</td>
</tr>
<tr>
<td></td>
<td>• high-technology and innovative nature of product</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• product with higher added value</td>
<td></td>
</tr>
<tr>
<td>Meso level</td>
<td>Production and sales-related costs</td>
<td>Hummels (1999)</td>
</tr>
<tr>
<td></td>
<td>specialists, equipment, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Participation of companies in processor chains</td>
<td>Tochitskaya &amp; Scriba (2010)</td>
</tr>
<tr>
<td></td>
<td>Innovativeness of companies</td>
<td>Negrea (2015); Ilzkovitz et al. (2012); Brenton et al. (2009)</td>
</tr>
<tr>
<td>Macro level</td>
<td>Economic independence of the country</td>
<td>Francois and Manshin (2007)</td>
</tr>
<tr>
<td></td>
<td>Development of the business environment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trade and tax policies</td>
<td>Tochitskaya &amp; Scriba (2010)</td>
</tr>
<tr>
<td></td>
<td>Labour market policy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correspondence of the volume of exports to global</td>
<td>Tochitskaya &amp; Scriba (2010); Ilzkovitz et al. (2012); Brenton et al. (2009)</td>
</tr>
<tr>
<td></td>
<td>demand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diversification of exports (by country and</td>
<td>Khusainov (2011)</td>
</tr>
<tr>
<td></td>
<td>commodity)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Productivity of the manufacturing industry</td>
<td>Tochitskaya &amp; Scriba (2010)</td>
</tr>
</tbody>
</table>

### Micro level

Usually the volume of exports is greater for countries that can offer goods of the required quality for a lower price (Negrea, 2015). Lederman and Maloney (2009) note a close connection between the variety of products, markets and economic growth (for the most part in developing countries); however, an opinion persists (Harrison & Rodriguez-Clare, 2009) that no connection exists between the variety of traded products and the competitive ability of exports. A number of researchers (Hummels & Klenow, 2005; Hallak & Sivadasan, 2009) hold the view that only improvement of the quality of the product can increase its competitive ability. A. Negrea (2015) also agrees that while readily available raw materials and prices are traditionally the main factors which determine the manufacturing and foreign trade structure of a country, in the case of a new product quality is very important in determining its competitive ability and gaining a significant share of the international market. In this case the quality may be improved by improving the product itself or the technology employed. A. Negrea (2015), however, notes that export dynamics are strongly affected by factors like the type and product range of the exported products as well.

Research by Grossman and Helpman (1991) deals with the reflection of innovations and development of new products (horizontal differentiation) and improvement of the quality of the product (vertical differentiation) on international trade. One should also note that empirical testing of mutual effects between exports and innovations produces inconsistent results (Golikova et al. 2012).

In the opinion of A. Negrea (2015), another factor which affects the growth of the competitive ability of exports positively is related to changes in export structure as a result of an increase in the volume of products with greater added value. M. Gelvanovsky (2006), on the other hand, maintains that goods which produce the greatest and the most stable economic effect as a result of their export to the global market must form the basis of exports.
Meso level

As indicated by I. Tochitskaya and A. Scriba (2010) a mandatory condition for ensuring the competitive ability of exports is reduction of costs related to the manufacturing and sales of products. According to Hummels's (1999) estimates the share of an exporter whose transportation costs are 1% lower than those of his competitors increases by 5–8% on the respective market. An important factor affecting the competitive ability of a country's exports is the involvement level of companies in global production chains. Cooperation with global manufacturers and vendors deserves more and more attention, because without such cooperation companies experience increasing difficulty in gaining any foothold on international markets. Being a part of global production chains is also important from the perspective of acquiring new technologies and implementing new quality standards and requirements (Tochitskaya & Scriba, 2010).

A. Negrea (2015) indicates that structural changes in manufacturing and the transition from traditional labour-intensive manufacturing to high-tech products may lead to a notable improvement of export indicators. Research suggests that many countries in the euro area are not sufficiently active in the field of refocusing their technological and export operation to fast-growing sectors, unlike developing countries such as China and India, which are developing their capacity for innovation and acquiring a significant share of the market in high-technology sectors (Negrea, 2015). This indicates a positive relation between innovation activity and export indicators. According to M. Gelvanovsky (2006), the competitive ability of enterprises, including export-related businesses, is ensured by the availability of resources (raw materials, specialists, equipment, etc.) as well as the ability to exploit these resources in an effective manner.

Macro level

Francois and Manshin (2007) have demonstrated that success in exportation depends on the development level of the business environment as well as the level of economic freedom in general. B. Khusainov (2011) indicates the importance of diversification of exports and points out that an extensive range of national exports is crucial to ensure larger trade volumes in physical and monetary terms.

I. Tochitskaya and A. Scriba (2010), on the other hand, accentuate the necessity to introduce an economic mechanism that would provide resources to manufacturing sectors and the most efficient enterprises that could be able to meet the competition in the long run to increase the competitive ability of exports. This requires detailed analysis and monitoring of interaction between the trade policy, tax policy, foreign exchange and labour market policy, and the business environment as well as monitoring of the influence of that interaction on decision-making in the investment sector, manufacturing and services sector and trade in general. In order to increase the competitive ability of exports government must provide tax and financial incentives (export loans and loan guarantees, drawback on customs duties, storage of goods in customs warehouses free of charge, etc.) to enterprises (Tochitskaya & A. Scriba, 2010).

In the long term, foreign trade indicators and the competitive ability of exports will, in the opinion of I. Tochitskaya and of A. Scriba (2010), depend in particular on production in the main sectors of the economy and on the productiveness of the manufacturing industry of the particular country compared to other countries. The competitive ability of exports depends on the country's ability to adjust to the dynamics of global demand as well. A beneficial effect may be achieved as a result of increasing the country's presence (share) in growth markets and reducing it in declining markets (Tochitskaya & A. Scriba, 2010). Shifts in demand in particular allow one to determine the role of goods presently considered most significant in the export basket of the country in the future growth of exports. It was established that countries directing their capacity for innovation into the field of high technology also aim to change their production structure in response to increased global demand (Ilzkovitz et al., 2012). However, for most countries, especially those with medium and high incomes, export growth for the most part occurs “by increasing sales of the same products to the same markets” (Brenton et al., 2009).

Thus, the analysis of the literature has displayed the variety of factors affecting the competitive ability of exports and their multileveled nature. The authors of this study agree with the opinion of analysts that all levels of competitive ability are interrelated, and to increase the competitive ability of exports, competitive advantages on all levels must be consolidated, as noted by M. Gelvanovsky (2006), using an efficient national development strategy.
The overall competitive ability of a country’s exports, in the opinion of the authors of this article, depends on certain properties of the exported goods (services) which are of particular importance for the export market, on the capacity of the manufacturers of the goods, and on the conditions created in the country for the development of production. Since there are numerous factors determining the competitive ability of exports and examination of the effects of all factors in one study is virtually impossible, this research will focus on the analysis of a number of factors on the macro and micro levels. An assessment of the development potential of the competitive ability of exports requires evaluation of its current indicators (volume, dynamics, diversification by country and groups of commodities, export market concentration, etc.) as well as establishing the commodities with the greatest competitive ability and a good market position.

3. ASSESSMENT METHODOLOGY FOR THE COMPETITIVE ABILITY OF EXPORTS

The competitive ability of Latvian exports was evaluated based on an analysis of statistical information, calculation of the Herfindahl-Hirschman Index (HHI), the Lafay index, and the Boston matrix. The aggregated indicators of the competitive ability of exports, which include the effects of factors of all levels, are as follows: export volume and its dynamics, diversification level of export by country and class of goods, etc.

Data from the Central Statistical Bureau (CSB) of the Republic of Latvia, Eurostat, and the interactive database of worldwide trade statistics Trade Map was used in the estimates of these indicators. Diversification of exports as one of the parameters of the competitive ability of exports was evaluated based on export concentration by country.

Diversification of export markets allows one to determine the level of dependency of a country on export markets and, respectively, the country’s exposure to external turbulence. For the quantitative assessment of the degree of diversification (concentration level) of exports by group of countries the Herfindahl-Hirschman Index (HHI) was used. The index is calculated as the sum of squares of export/import share indicators of a country from the total volume of its national exports/imports (Formula 1).

\[ HHI = D_1^2 + D_2^2 + ... + D_n^2, \]

where \( n \) – the number of countries.

Based on the values of concentration ratios and the Herfindahl-Hirschman Index, three types of markets are distinguished:

- Type I – highly concentrated markets: \( 2000 < HHI < 10 000 \);
- Type II – moderately concentrated markets: \( 1000 < HHI < 2000 \);
- Type III – low concentration markets: \( HHI < 1000 \) (Khusainov 2011).

In this study, the Herfindahl-Hirschman Index was calculated for Latvia's exports and imports, and this allows one to assess the geographic dispersion of countries from which Latvia imports goods as well. For the calculation of HHI, countries were selected based on the share of exports – 20 countries – and imports: 18 countries. The selection includes countries whose share of exports/imports in 2015 exceeded 1% of the total volume. Calculations were carried out based on data from the Trade Map database.

Latvia's key exports were selected for analysis of the competitive ability of exported goods and evaluation of their market position and development prospects on world markets. 18 classes of goods were selected whose share in the total volume of exports in 2015 exceeded 1%. The volume of exports was determined based on data obtained from the Trade Map database, according to the Harmonized Commodity Description and Coding System for international trade HS6 at the 4-digit level. For the convenience of information perception, the names of product groups used in the Trade Map database have been shortened. For example, product group 8517 with the title: Telephone sets, incl. telephones for cellular networks or for other wireless networks; other, has been shortened to Telephone sets.

Evaluation of the commercial competitive ability of a commodity in this study was carried out based on the Lafay index \((LFI)\), determined according to formula (2).

\[ LFI_i = K \times \left[ (X_{d,i} - M_{d,i}) - (X_d - M_d) \times \left( \frac{X_{d,i}+M_{d,i}}{X_d+M_d} \right) \right], \]

where \( LFI_i \) – the indicator of the estimated comparable advantage of country \( d \) with respect to
commodity i, X and M – export and import, while K – a constant equal to $\frac{1000}{X_d + M_d}$.

This method allows one to compare the actual industry balance of the country with a hypothetical balance which the country could have without the specialization. The index is negative if the imports of the commodity exceeds its exports, which suggests that the country lacks competitive ability on that market. If the index is positive, the country is able to meet competition on the global market for the commodity (Gurova, 2012).

The Boston matrix was used to assess the market position of exported goods. This further served to assign Latvia's major exports to one of the four classes based on growth rate indicators of global exports and growth rate indicators of market share of the specific goods: “Stars”, “Cash cows”, “Question marks” or “Dogs”. Exports designated as “Stars” and “Question marks” are the ones best able to meet the competition, because they have high export growth rates on world markets. “Stars” make up a significant part of the country's share in world exports, while “Question marks” make up a small part, which means that these goods are in demand, but the country lacks capacity for their export.

In order to determine the exports with the best prospects for increasing export volume, the growth of supply must be adjusted to the growth of global demand for products exported by Latvia. For this purpose, export growth trends (supply) should be compared to the growth trends of world imports (demand) for each type of exported products. The interactive Trade Map system provides the means for the analysis of these ratios and enables one to break the exported products down into four classes:

1. “Champion” products have a high supply and demand growth rate. These products are best able to meet competition and ensure growth of the exporting country's share in the global market for these types of products.
2. On rapidly growing world markets supply growth in the case of “Passive” products is usually on the decrease or insignificant. Trade in these products has export growth potential.
3. “Loser” products are characterised by decreasing demand and supply and reduction of the market share. Export of such products has little room for growth.
4. “Achiever” products on unsuccessful markets are goods with a growing volume of exports in spite of declining demand.

“Champion” and “Passive” products have good prospects due to the rapid growth of global demand for them in contrast to other product classes with stagnating or declining demand (Gurova, 2012).

Data for the period of 2008-2015 was analysed due to the fact that 2008 was the first year of the crisis, while 2015 is the last year for which data is available for analysis in the sources of information used.

4. LATVIA’S FOREIGN TRADE PERFORMANCE

In order to evaluate the overall situation in Latvia's foreign trade, the dynamics of the relative and absolute indicators of commodity turnover, Latvia's exports and imports were analysed in comparison with global indicators.

During the period under consideration (see Fig. 1), foreign trade turnover multiplied by 1.35 times and reached 22 906 million euros in 2015; the growth of exports (1.66 times) exceeded the growth of imports (1.17 times).

Figure 1 shows that the development of Latvia's foreign trade continues, but has slowed down compared to the period after the economic crisis of 2008.

After a sharp decline of foreign trade indicators in 2009, the following three years (2010-2012) were characterised by steady growth of the indicators, but after 2012 the growth rate of goods’ turnover slowed down as a result of deceleration of export and import growth as well as a decrease in the volume of imports in 2015. Latvian export and import volume growth slowdown trends coincide with those of the EU’s performance in foreign trade (Eurostat, 2016).

Foreign trade turnover is dominated by imports, resulting in a trade balance deficit, which decreased gradually after 2013 due to an increase in export growth rates over import growth rates.

All in all, the trends identified in Latvia's foreign trade indicators correspond to changes in the respective global indicators.
Geographical diversification of Latvia's exports is adequate. According to Latvian statistics, in 2015 goods from Latvia were exported to more than 200 different countries, though for the most part the share of each of Latvia's export partners does not exceed 5%. The main export partners are the EU countries, the share of which in total exports consistently exceeds 70% (73% in 2015) (CSB of Latvia, 2016).

As indicated by research (Pancenko & Ivanova, 2016), Latvia exports goods to all EU countries; the volume and range of exports, however, vary significantly from country to country. The share of exports to CIS countries amounts on average to 15% and the main export partner in this group is Russia. In 2015 the share of CIS countries in Latvia's exports dropped to 12% as a result of the introduction of mutual sanctions. However, Latvia was able to partially divert the flow of exports to other countries so that the share of other countries increased and constituted 15%. In this group the volume of exports is fractured among a number of countries, among which over 1% of exports go to Turkey, Algeria and the USA.

Figure 2 shows the export structure by country from 2008 to 2015. The ranking of Latvia's leading export partners during the reviewed period undergoes almost no change.

In 2015 Latvia's main export partners were the same European countries: Lithuania (19%) and Estonia (12%), with the Russian Federation (8%) in the third position, followed by Germany (7%), Poland (6%), Sweden (5%), the United Kingdom (5%), and Denmark (4%). The share of exports to Lithuania, Poland and the United Kingdom during the reviewed period increased, but the share of exports to other countries decreased.

The growth rate of the volume of goods imported by Latvia's export partners reflects the growth of demand for these goods and thus allows one to speculate about prospects for collaboration with these countries. In this regard the negative growth rate of the volume of imports of most of Latvia's partners in 2015 should be noted. Import growth was evident only in Algeria and the USA, but the share of these countries in Latvia's exports is insignificant. The growth rate of Latvia's exports to Estonia, Germany, Finland and Algeria falls behind the growth rate of world imports of these countries, and that could...
show the potential for increasing the volume of exports to these countries. International trade statistics indicate that the share of Latvia's exports in the total volume of world exports is insignificant, just around 0.1%; however, it has been increasing gradually (from 0.58% in 2008 to 0.741% in 2015).

1045 positions of goods (according to the Harmonized Commodity Description and Coding System HS6 at the 4-digit level) were exported by Latvia in 2015 (Trade Map, 2016). Latvia exports a large variety of goods in small quantities. The maximum volume of one type of exported goods in 2015 amounted to 5.65% in the class of products Telephone sets (8517). Only the shares of 18 classes of products exceeded 1% in the total volume of exports; the share of the other product classes did not exceed 1% (see Figure 3).

![Figure 3. The structure of exports by class of products in 2015 (Trade Map, 2016)](image)

Growth of the sales volume of a product proves its competitive ability, because it indicates growing demand for the product. The dynamics of export volume by class of products are presented in Figure 4.

![Figure 4. Dynamics of the volume of Latvia's exports from 2008 to 2015, thousand EUR (Trade Map, 2016)](image)
Latvia's exports have a negative trend of unstable product dynamics in most classes of products as illustrated by Figure 4. During the period of 2011-2015 the following products had the highest average annual growth of export volume: Telephone sets (45%), Wheat and meslin (17%), Automatic data processing machines (13%) and Parts & access. of motor vehicles (10%). However, a number of products had negative average annual dynamics: Cars (incl. station wagons) (-14%), Wood in the rough (-12%), Petroleum oils (-3) and others (Trade Map, 2016).

During the considered period several classes of products replaced one another in the leading position. From 2008 to 2011 the product class Wood sawn/chipped lengthwise (4407) was the leader, in 2012 and 2013 products in the class Petroleum oils (2710) took the leading position, and in 2014 and 2015 products in the class Telephone sets (8517) had the leading position with an export volume of 585480 thousand EUR (see Figure 4).

It is worth noting that in 2015 the sales volume of such important exports as Telephone sets, Petroleum oils, Spirits, other spirit beverages, Cars (incl. station wagon), Wood in the rough, Particle board & similar board of wood and Builders' joinery & carpentry of wood decreased. For the past 3 years there has been a steady growth of the export volume of the following classes of products: Wood sawn/chipped lengthwise, Wheat and meslin, Medicament mixtures, Fuel wood, Television receivers, Plywood, Parts & access. of motor vehicles, Other furniture and parts thereof, Peat, Automatic data processing machines and Glass fibres.

The present and future competitive ability of Latvian goods should not be assessed based only on the growth of sales volume; an analysis of the ability of these goods to meet the competition in the export countries is required as well. The Lafay index will be calculated for that purpose for the most important Latvian exports.

5. ASSESSMENT OF THE COMPETITIVE ABILITY OF LATVIA'S EXPORTS

Diversification of Latvia's exports

Evaluation of the diversification of Latvia's exports and imports by country indicates that during the entire period under consideration the strength of market forces is not concentrated in the hands of a limited number of entities; on the contrary, it is diversified by countries of export as well as import.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports</td>
<td>772.90</td>
<td>748.19</td>
<td>764.61</td>
<td>823.06</td>
<td>740.95</td>
<td>781.24</td>
<td>792.59</td>
<td>743.84</td>
</tr>
<tr>
<td>Imports</td>
<td>762.47</td>
<td>765.46</td>
<td>739.70</td>
<td>801.11</td>
<td>845.19</td>
<td>872.99</td>
<td>799.03</td>
<td>781.81</td>
</tr>
</tbody>
</table>

This is evidenced by the value of the index (HHI) for exports and imports for each year (under 1000), which is characteristic for the third market type – low concentration (see Table 2). Thus, the diversification level of external markets is instrumental to the development of Latvia's exports. The dynamics of the index do not have a clear upward or downward trend.

Analysis of the competitive ability of exported goods

The competitive ability of Latvian goods on the world market was evaluated based on the Lafay index. A country is able to meet competition on the global market for a particular commodity if the index has a positive value. A positive index value suggests the presence of competitive advantages. The higher the value of the index, the higher the competitive ability. The index has a negative value if imports of the commodity exceed its exports by the same country, which suggests the inability of the country to meet competition on the respective market.

Table 3 contains the results of Lafay index analysis for 18 product classes with a significant share in the total volume of Latvia's exports. The analysis was based on available data of the past two years (2014 and 2015), which, in the authors’ opinion, is sufficient to evaluate the current situation of the competitiveness of Latvian exported goods.

Based on the analysis, in 2014 and 2015 14 out of 18 major Latvian exports had a positive Lafay index. The following product classes were not able to meet competition: Automatic data processing machines (8471); Medicament mixtures (3004); Cars (8703). In 2015 the competitive ability of the product class
Other furniture and parts thereof (9403) increased, while the product class Petroleum oils (2710) lost its competitive ability.

The products with competitive advantages in 2015 based on the Lafay index evaluation are as follows: Wood sawn/chipped lengthwise (4407); Wheat and meslin (1001); Fuel wood (4401); Spirits, other spirit beverages (2208); Plywood (4412); Particle board and similar board of wood (4410); Telephone sets (8517); Peat (incl. peat litter), w/n agglomerated (2703); Builders’ joinery & carpentry of wood (4418); Other furniture and parts thereof (9403); Glass fibres (incl. glass wool) and articles thereof (7019); Wood in the rough (4403); Television receivers (8528); Parts & access. of motor vehicles (8708).

**Table 3**

**Analysis of the competitive ability of exported products** (authors' calculations based on Trade Map data)

<table>
<thead>
<tr>
<th>No.</th>
<th>Product</th>
<th>LFI&lt;sub&gt;i&lt;/sub&gt; 2014</th>
<th>LFI&lt;sub&gt;i&lt;/sub&gt; 2015</th>
<th>Growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4407 Wood sawn/chipped lengthwise</td>
<td>23,88</td>
<td>23,55</td>
<td>-1%</td>
</tr>
<tr>
<td>2</td>
<td>4401 Fuel wood</td>
<td>11,44</td>
<td>12,35</td>
<td>8%</td>
</tr>
<tr>
<td>3</td>
<td>4412 Plywood</td>
<td>7,14</td>
<td>7,21</td>
<td>1%</td>
</tr>
<tr>
<td>4</td>
<td>4410 Particle board and similar board of wood</td>
<td>6,44</td>
<td>6,29</td>
<td>-2%</td>
</tr>
<tr>
<td>5</td>
<td>4418 Builders’ joinery &amp; carpentry of wood</td>
<td>3,94</td>
<td>4,22</td>
<td>7%</td>
</tr>
<tr>
<td>6</td>
<td>4403 Wood in the rough</td>
<td>6,1</td>
<td>3,5</td>
<td>-43%</td>
</tr>
<tr>
<td>7</td>
<td>1001 Wheat and meslin</td>
<td>11,08</td>
<td>13,7</td>
<td>24%</td>
</tr>
<tr>
<td>8</td>
<td>2208 Spirits, other spirit beverages</td>
<td>13,53</td>
<td>7,85</td>
<td>-42%</td>
</tr>
<tr>
<td>9</td>
<td>8517 Telephone sets</td>
<td>5,66</td>
<td>4,98</td>
<td>-12%</td>
</tr>
<tr>
<td>10</td>
<td>8528 Television receivers</td>
<td>1,82</td>
<td>2,04</td>
<td>12%</td>
</tr>
<tr>
<td>11</td>
<td>2703 Peat (incl. peat litter), w/n agglomerated</td>
<td>5,73</td>
<td>4,75</td>
<td>-17%</td>
</tr>
<tr>
<td>12</td>
<td>9403 Other furniture and parts thereof</td>
<td>-27,79</td>
<td>3,93</td>
<td>114%</td>
</tr>
<tr>
<td>13</td>
<td>7019 Glass fibres (incl. glass wool) and articles thereof</td>
<td>3,6</td>
<td>3,82</td>
<td>6%</td>
</tr>
<tr>
<td>14</td>
<td>8708 Parts &amp; access. of motor vehicles</td>
<td>1,37</td>
<td>1,35</td>
<td>-1%</td>
</tr>
<tr>
<td>15</td>
<td>8471 Automatic data processing machines</td>
<td>-1,76</td>
<td>-1,1</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>3004 Medicament mixtures</td>
<td>-1,94</td>
<td>-1,99</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>8703 Cars (incl. station wagons)</td>
<td>-7,53</td>
<td>-7,7</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>2710 Petroleum oils</td>
<td>7,82</td>
<td>-17,99</td>
<td>-</td>
</tr>
</tbody>
</table>

In 2015 the Lafay index for the following classes of products increased compared to 2014, which means that the advantages of products in the following classes had established themselves: Wheat and meslin (1001), Television receivers (8528), Fuel wood (4401), Builders’ joinery & carpentry of wood (4418), Glass fibres (incl. glass wool) and articles thereof (7019), Plywood (4412).

For the remaining classes of products the index has gone down. It has dropped by 43% for Wood in the rough (4403), by 42% for Spirits, other spirit beverages (2208), and by 12% for Telephone sets (8517). The results indicate that Latvia has not lost the ability to compete on the global market. The export product best able to meet the competition is Wood and articles thereof (70,34). Exports of spirits and grain varieties are worth noting as well, but exporters must nonetheless look for new ways to develop these products and distribute them on the global market.

**Determining the market positions of the exported goods on the global market**

The Boston matrix (BKG) was used to determine the market positions of competitive Latvian products. The distribution of exported products into classes is presented in Table 4.
Latvia’s leading export products (based on export volume) are in demand on the global market, and in 2015 market growth for these products was 1% to 8%. But because of their small shares in the global export market (up to 2.3%) they can be classified as "Question marks". These products have the potential to increase the export volume and require support. This class includes products with the most rapid growth of export volume: Telephone sets (8517), Wood products (code 44), Cars (incl. station wagons) (8703), Medicament mixtures (3004) and Glass fibres (7019). It should be noted that Medicament mixtures (3004) and Cars (incl. station wagons) (8703) were classified as lacking in competitive ability based on Lafay’s method. That is the result of their negative trade balance; the growth of the market for these products indicates growing demand for them. It is possible that in this case the reason is a specific product with competitive advantages on the external market.

The position of "Stars" among the goods exported by Latvia with a relatively large share of the country in global exports (3.9%) and a high export growth rate (4% in 2015) is occupied by Fuel wood. A number of goods occupy the position of "Dogs", since they are in low demand on world markets (in 2015 their market growth rate was -9% to 0%) and have a small market share. These products are: Spirits, other spirit beverages, Automatic data processing machines, Wheat and meslin, Television receivers and Petroleum oils.

The position of "Cash cow" is taken by Peat (2703), with the largest market share in the global export market (12.1% in 2015) among Latvia’s exports, but that is due to the small volume of the commodity in global exports (1047 million EUR in 2015). Market growth for this type of commodity was 0% in 2015.

### Table 4

**Market positions of products exported by Latvia based on the Boston matrix, 2015**

(authors’ calculations based on Trade Map data)

<table>
<thead>
<tr>
<th>“Question marks”</th>
<th>Market growth, %</th>
<th>Share of market, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>8517 Telephone sets</td>
<td>8%</td>
<td>0.1%</td>
</tr>
<tr>
<td>4418 Builders’ joinery &amp; carpentry of wood</td>
<td>4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>4407 Wood sawn/chipped lengthwise</td>
<td>3%</td>
<td>1.9%</td>
</tr>
<tr>
<td>4412 Plywood</td>
<td>3%</td>
<td>1.3%</td>
</tr>
<tr>
<td>9403 Other furniture and parts thereof</td>
<td>3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>8703 Cars (incl. station wagons)</td>
<td>2%</td>
<td>0.03%</td>
</tr>
<tr>
<td>4403 Wood in the rough</td>
<td>2%</td>
<td>1.1%</td>
</tr>
<tr>
<td>3004 Medicament mixtures</td>
<td>1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>8708 Cars (incl. station wagons)</td>
<td>1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>4410 Particle board and similar board of wood</td>
<td>1%</td>
<td>2.3%</td>
</tr>
<tr>
<td>7019 Glass fibres (incl. glass wool) and articles thereof</td>
<td>1%</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Stars”</th>
<th>Market growth, %</th>
<th>Share of market, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>4401 Fuel wood</td>
<td>4%</td>
<td>3.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Dogs”</th>
<th>Market growth, %</th>
<th>Share of market, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2208 Spirits, other spirit beverages</td>
<td>0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>8471 Automatic data processing machines</td>
<td>-1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1001 Wheat and meslin</td>
<td>-4%</td>
<td>0.9%</td>
</tr>
<tr>
<td>8528 Television receivers</td>
<td>-4%</td>
<td>0.3%</td>
</tr>
<tr>
<td>2710 Petroleum oils</td>
<td>-9%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>“Cash cows”</th>
<th>Market growth, %</th>
<th>Share of market, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2703 Peat (incl. peat litter), w/n agglomerated</td>
<td>0%</td>
<td>12.1%</td>
</tr>
</tbody>
</table>
Determining goods with export volume growth potential

Based on a comparison of demand (average annual growth of global imports) and supply of commodities exported by Latvia (average annual growth of Latvia’s share in international exports) and using Trade Map database tools, the authors determined the goods with the best prospects for increasing the export volume (see Table 5).

Table 5
Goods with export volume growth potential (prepared by the authors based on Trade Map data)

<table>
<thead>
<tr>
<th>“Passive” products</th>
<th>“Champion” products</th>
</tr>
</thead>
<tbody>
<tr>
<td>4403 Wood in the rough</td>
<td>8517 Telephone sets</td>
</tr>
<tr>
<td>4410 Particle board and similar board of wood</td>
<td>8708 Parts &amp; access. of motor vehicles</td>
</tr>
<tr>
<td>4412 Plywood</td>
<td>8471 Automatic data processing machines</td>
</tr>
<tr>
<td>4418 Builders' joinery &amp; carpentry of wood 3004 Medicament mixtures</td>
<td>4401 Fuel wood 4407 Wood sawn/chipped lengthwise</td>
</tr>
<tr>
<td>8703 Cars (incl. station wagons)</td>
<td>9403 Other furniture and parts thereof</td>
</tr>
<tr>
<td>2208 Spirits, other spirit beverages</td>
<td>7019 Glass fibres (incl. glass wool) and articles thereof</td>
</tr>
<tr>
<td>2703 Peat (incl. peat litter), w/n agglomerated</td>
<td></td>
</tr>
</tbody>
</table>

“Loser” products

| “Achiever” products in declining sectors |
| None |
| 1001 Wheat and meslin |
| 8528 Television receivers |
| 2710 Petroleum oils |

Based on Trade Map data for 2015, for the most part goods with considerable export volume are in demand on the global market, regardless of the fact that growth of Latvia's share in global exports is insignificant, which could be the result of the insufficient capacity of Latvian enterprises.

The obvious “Champions” are Telephone sets (8517) and Parts & access. of motor vehicles (8708). Regardless of the fact that Parts & access. of motor vehicles (8471) were put into the class of “Champion” products by the system, demand for this type of product on the global market has decreased during the last few years. In addition, as a result of the overbalance of imports over exports, this class of products was classified as lacking in competitive ability based on the Lafay index.

For the most part “Passive” products with potential on the global market come from the woodworking industry, but there is also demand for Wood in the rough (4403).

The group of “Passive” products includes Medicament mixtures (3004) and Cars (incl. station wagons) (8703) as well, which indicates that there is a demand for them.

As a result of the analysis classes of products with export volume growth potential have been determined; however, any conclusions about increasing the volume of Latvia's exports require a far more detailed analysis of specific products in these classes as well as an analysis of the industrial capacity of their manufacturers.

CONCLUSIONS

1. The competitive ability of exports is influenced by various interrelated factors, which are divided into macro, micro and meso levels.
2. The methods used for the analysis of competitive ability sometimes produce contradictory results. A more detailed analysis of such contradictions is required.
3. All in all, the trends in Latvia's foreign trade indicators (commodity turnover, export volume and import volume) obtained as a result of the analysis correspond to changes in the respective global indicators.
4. Latvia's main export partners are EU countries (Lithuania, Estonia, Germany, Poland, Sweden, the United Kingdom, and Denmark) and the Russian Federation. The share of other countries is insubstantial and does not exceed 2% of the total volume of Latvia's exports.
5. The dynamics of the volume of exports by country are unstable; exports to a number of countries (Estonia, Germany, Finland, Algeria) lag behind, which could be an indicator of a potential for an increase in Latvia's exports to these countries.
6. The market of export and import of commodities is diversified; the existing structure of external markets encourages the development of Latvia's exports.

7. Latvia exports a large variety of goods in small volumes; the share of each is up to 1% of the total volume of exports. The export dynamics of commodities are unstable; during the last 3 years the volume of exports of the following classes of products increased constantly: Wood sawn/chipped lengthwise (4407), Wheat and meslin (1001), Medicament mixtures (3004), Fuel wood (4401), Television receivers (8528), Plywood (4412), Parts & access. of motor vehicles (8708), Other furniture and parts thereof (9403), Peat (incl. peat litter), w/n agglomerated (2703), Automatic data processing machines (8471) and Glass fibres (incl. glass wool) and articles thereof (7019).

8. Analysis of the competitive ability of Latvia's exports using the LaFay index shows that only 14 (out of 18) positions of important Latvian exports have competitive advantages.

9. According to the BKG matrix analysis, goods with the potential to increase export volume include Telephone sets (8517), Wood products (44 Product code), Cars (incl. station wagons) (8703), Medicament mixtures (3004) and Glass fibres (incl. glass wool) and articles thereof (7019), since these goods have the highest export volume growth rates.

10. Goods in high demand on the global market, but with a low export volume growth rate (“Passive”) have been determined. These goods have the potential to increase their export volume and include: Wood in the rough (4403), Particle board and similar board of wood (4410), Plywood (4412), Builders' joinery & carpentry of wood (4418), Medicament mixtures (3004), Cars (incl. station wagons) (8703).

11. Any conclusions about possibilities of increasing the volume of Latvia's exports require a more detailed analysis of specific types of products in the product classes considered as well as an analysis of the industrial capacity of their manufacturers.

RECOMMENDATIONS

1. Foreign trade relations analysts and motivated Latvian exporters should further investigate the possibilities of increasing exports to Estonia, Germany, Finland, and Algeria in order to more fully exploit the trade potential with these countries.

2. Foreign trade relations analysts should perform an additional analysis and look for the reasons for the volatile nature of export volume dynamics (decrease) in the breakdown by commodities and export partners. That would serve as a foundation for the development of efficient measures for support of Latvia's exports by the state and its future development.

3. The possibility should be assessed of increasing exports of “Passive” products: Wood in the rough (4403), Particle board and similar board of wood (4410), Plywood (4412), Builders' joinery & carpentry of wood (4418), Medicament mixtures (3004), Cars (incl. station wagons) (8703); and “Champion” products: Telephone sets (8517), Parts & access. of motor vehicles (8708), Automatic data processing machines (8471), Fuel wood (4401), Wood sawn/chipped lengthwise (4407), Other furniture and parts thereof (9403), Spirits, other spirit beverages (2208), Glass fibres and articles thereof (7019), and Peat (2703). They have good prospects due to the high growth of global demand for them.

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MOBILE COMMUNICATION TECHNOLOGIES AS AN INTEGRATED MARKETING COMMUNICATIONS INSTRUMENT IN PROMOTING HIGHER EDUCATION INSTITUTIONS

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Abstract

Purpose. The purpose of the study is to define the modern methods of effective marketing interaction between the university and its target audience, considering the implementation of mobile marketing strategy.

Design/methodology/approach. Theoretical analysis and summarisation of the scientific literature, periodicals, information from international research companies and materials from higher education institutions were used to explore the complex characteristics of mobile marketing strategy.

Findings. Tightening of competition between higher education institutions both at the national level and within the international academic sphere requires universities to seek new ways to increase their attractiveness. Mobile marketing strategy should be the basis and an integrating element of the information and communication interaction between modern universities and their target audience.

Originality/value. The value of the approach, grounded in the study, lies in formulating recommendations for the implementation of mobile marketing strategy by higher education institutions. The article describes marketing opportunities for mobile marketing in the activities of the modern university, consisting of strengthening marketing’s impact on target groups of educational service consumers.

Keywords: marketing communications, mobile marketing, optimization of communicational processes, mobile marketing strategy, integrated marketing communication

1. INTRODUCTION

The recent decade has seen a drastic change in Russian education market opportunities: society’s growing requirements for quality in vocational education, the change in economic conditions, state policy aimed at reducing inefficient education institutions – all this greatly influences a university’s functioning. Nowadays, competition among Russian higher education institutions is to be observed not only on the internal market, embracing domestic universities that offer similar training directions. Foreign universities have also gained popularity on the Russian market with their own education programmes. The rapid development of modern digital technologies and the implementation of distance learning have opened national borders for education services from abroad.

A global tendency has recently been observed in Russia – higher education has turned from something elite into a mass phenomenon. Modern universities offer services based on the principle of continuing education, according to which a bachelor’s degree may be followed by a master’s degree and then by a post-graduate course as well as a wide range of additional vocational education programmes. These tendencies have influenced the growing number of education service consumers and the number of higher education institutions. Today, an education reform is being carried out in Russia which is aimed at reducing the number of universities, closing or reorganising inefficient ones. With these factors in mind, competition in the sphere of education services has become especially fierce. There has been a constant struggle to increase student and trainee enrolment. In this regard, Russian universities are challenged with the task of improving their competitiveness and struggling for each applicant. They have to develop their marketing plans and positioning thoroughly, think out methods of measuring marketing efficiency and build an integrated marketing communications strategy, using such promotion technologies that seem to be most appropriate for attracting a young audience. Mobile marketing technologies may be especially effective tools nowadays.
Intensification of competition among higher education establishments both on a nationwide scale and in the international academic context makes them search for new ways to win people over. Under the tough conditions of the Russian educational system reform, integration with international educational systems and standards, and the unfavourable demographic and economic situation, higher education establishments have actively started to use the full range of marketing communications, devoting special attention to mobile marketing.

2. MOBILE MARKETING STRATEGY AND INTEGRATED MARKETING COMMUNICATIONS

Mobile marketing strategy as an integral part of marketing strategy plays a pivotal role in promoting a higher education establishment. However, while developing a strategy of mobile communications of any kind, the general strategy of the company should be of prime importance, followed by the integrated marketing strategy and then the strategy for marketing communications in the mobile environment.

Strategic planning is “the process of developing and maintaining a real correspondence between the company's goals and resources and changing environmental conditions. The point of this process is to gain a sufficient profit and to achieve an acceptable rate of growth in keeping with the mission”. (Burnett et al., 2001). Strategic planning helps in four types of decision-making: it enables one to set goals (the focus of the plan), to choose strategies (the ways of achieving goals), to form tactics (the set of short-term solutions to specific problems of strategy implementation), and to determine the method of control (monitoring, modification and efficiency evaluation).

Strategic planning of mobile marketing is aimed at implementing the functions of all the communication tools in the mobile environment in the most efficient way as well as integrating them with other marketing communications, including advertising, PR, direct marketing, sales promotion, and event marketing in the online and offline environment. Moreover, its purpose is to control the interaction of these elements with the marketing mix (product, price, distribution). Strategic planning helps in identifying the most appropriate and efficient combinations of methods to deliver information and content.

For Russian universities, a transition to an integrated marketing communications system is the most promising way of interacting with education service customers and other target audiences. Schultz (1993) defined IMC as a concept of marketing communication planning that combines and evaluates the strategic roles of different communication tools to achieve clarity, consistency and a greater impact. According to the American Association of Advertising Agencies, integrated marketing communication is a concept of planning marketing communications defined by the evaluation of strategic roles of their specific fields (advertising, sales promotion, public relations, etc.) and searching for an optimal combination to provide consistency and maximum impact of communication programmes through integrating all aspects involved. A university’s integrated marketing communications system is designed to coordinate means of promotion and carry out strategic operations in order to develop a positive image through communication tools. The following are considered to be the most important marketing communications tools for promoting a university: advertising, public relations, direct marketing, exhibitions, personal sales, Internet marketing and mobile marketing. Each marketing communications tool has its own specific ways of reaching the target audience. Combining various communication tools into a system of integrated marketing communications allows one to enhance the efficiency of each instrument and affects efficiency as a whole.

A crucial factor that has been particularly relevant in the system of integrated marketing communications is the development of telecommunications and digital technologies, mobile devices, computers and the Internet. They anticipated the active use of digital marketing – a modern means of promoting brands, products and services using all digital channels and the corresponding marketing communications tools (television, radio, Internet, mobile phones, etc.).

Therefore, in order to respond to modern challenges, marketing has to alter its ideology of advertising messages. It has to be transformed from an indirect impersonal appeal to personal communication with the target audience via direct bilateral communication channels in accordance with the modern concept of relationship marketing. The achievement of the marketing effect is possible due to communication channels’ modernization together with applying a new professional toolkit: mobile and internet marketing accompanied by SMM – social media marketing. (Neretina E., et al., 2013).
3. MOBILE TECHNOLOGIES HAVE RADICALLY CHANGED THE APPROACH TO COMMUNICATIONS

These days, a most fundamental trend has been observed — the mobile experience is starting to dominate over all others. Smartphones are gradually becoming integral parts of their owners. They are used more often than any other devices and are closely connected with a new type of interaction — so-called “micro moments”.

Young people aged 12-20 prefer mobile devices to traditional PCs and laptops. They keep changing the usual traffic and directly influence the development of additional services such as messengers, new mobile TV formats, applications with geolocation and all possible additional functions.

A mobile-only community has come into existence and such people use only mobile devices (smartphones and tablets, not laptops and desktops) to access the Internet. While the population of this community was only 14 million in 2010 globally, the figure reached 788 million in 2015. (Cisco, 2015).

Mobile marketing technology has radically changed the media environment, opening up new opportunities for marketers to promote brands. Today, mobile devices have surpassed television in terms of screen interaction time in the "multiscreen" community and market research by Millward Brown proves it. On average, users that have the ability to view information on different screens spend 113 minutes a day watching television and 197 minutes with mobile gadgets (smartphone 147 minutes + tablet 50 minutes). (Novak K., 2015).

There is another trend in the use of devices — multiscreening, the simultaneous use of more than one device. Thus, approximately 62% of consumers use mobile devices while watching TV. Among those aged 20-34, on average, 69% look for information on their mobile device after they see it on their television screens. According to research by Microsoft, by 2017, every Internet user will have about five different devices. Marketers need to understand how users will interact with these devices in order to build a coordinated multi-channel digital strategy.

Information from the research resources Comscore and Statista is of particular interest here. (Kuvaev R. (2013).

Total global sales of smartphones and tablet PC sales already exceeded PC sales three times in 2013, and a fivefold rise is predicted by 2017. This rapid spread of smartphones will, in turn, lead to a mobile Internet "boom". We can see the rapid growth in popularity of the mobile Internet now — if in 2012 the average amount of time a user spent on the mobile Internet was 74.4 minutes per day, in the second quarter of 2014 this figure reached 108.6 minutes per day, and this means that this index is about 50% larger. (ComScore, 2014)

![Figure 1. The active subscriber base of mobile data mln people globally (2007-2015 biennium).](ComScore, 2014)

We can see the high index of mobile Internet use in Russia. According to TNS, in December 2014 the proportion of mobile device users that used the Internet at least once a month was 68% for Russia and 73% in Moscow (of Internet users in general).
Smartphone owners are the most active mobile Internet users as of year-end 2014; 52.6 million subscribers used mobile data transmission, generating an average of 1.2 GB of traffic a month per user.

Regular mobile phone substitution by smartphones and, as a consequence, the growth of mobile Internet use has led to a transformation in the model of consumer behaviour in terms of receiving information. Educational institutions are faced with the need to actively apply the tools of mobile marketing in the promotion of educational services.

4. MOBILE MARKETING AS AN EFFECTIVE INSTRUMENT OF COMMUNICATION WITH THE TARGET AUDIENCE

The Mobile Marketing Association (MMA), an international organization aimed at measuring and maintaining the growth of mobile marketing and related technologies, provides the following definition of mobile marketing: “the use of mobile media as an integrated delivery of content and a direct communication tool in cross-media marketing communication programs”. Therefore, mobile marketing is one of the many marketing communications tools, the whole strategy’s effectiveness depending on a mobile channel’s integration into other traditional and digital media elements. For instance, mobile marketing tools may be used together with direct advertising (TV, outdoor, radio and print), thus enhancing the overall effectiveness of a marketing campaign.

According to A. Safin, mobile marketing is a combination of marketing measures aimed at promoting products or services with the use of cellular communication as well as by means of tailoring these measures to mobile devices (telephones, smartphones, communicators, tablets, etc.) (Safin A., 2011)

We stick to the following definition of mobile marketing: a combination of measures aimed at promoting a product, a service or an idea by means of providing content and interactive communication with the customer, which is carried out with the help of mobile devices and gadgets.

It is important for marketers to consider the large number of tasks that can be solved with the help of mobile marketing. Unlike other technologies, which are mainly focused on one marketing goal – television influences brand awareness, direct marketing is focused on establishing contact – mobile marketing provides solutions and opportunities with regard to all marketing problems.

4.1. A LIST OF MOBILE MARKETING TOOLS

While new mobile tools, platforms and applications are introduced relatively frequently, the Mobile Marketing Association (MMA) has identified a number of them that are particularly important (MMA, 2016):

• **Mobile video, display or audio ads:** Mobile display ads are an effective way to engage customers and prospects. There are a number of different formats for mobile display ads. The MMA has a recommended Universal Mobile Ad Package UMAP to make it easier for marketers to create mobile ads for smartphones, feature phones and tablets. Additionally there are rich media formats, mobile video as well as mobile audio ads, all used to drive deeper brand engagement and revenue.

• **Mobile websites:** This is a version of your desktop website that has been specifically designed to be compatible with mobile devices. Mobile websites deliver an engaging and streamlined mobile experience that appeals to a mobile visitor who is using their smartphone or tablet to connect with your brand.

• **Mobile applications (mobile apps):** Not to be confused with mobile websites, mobile apps are software programs that can be downloaded on a smartphone or tablet. Apps can be used by brands to educate, entertain, engage and/or sell products to users.

• **Response codes:** According to CMBInfo.com, 50% of smartphone users have scanned QR codes and 18% have made a purchase as a result. There are a number of different kinds of response codes, the most common of which are QR codes, Microsoft TAGs, ScanLife, SPARQCodes and others.

• **Mobile Search Marketing:** Mobile Search, like desktop search, is a powerful way to connect consumers with your brand. It is important to note that search behaviour and motivations can differ in the mobile environment and that search results will appear differently on mobile devices vs. a desktop or laptop. It is also critical to take your customers to mobile optimized pages to deliver a completely enhanced mobile experience. Lastly, consumers can amplify and share your messages more easily on mobile devices, thereby increasing the viral potential of your mobile search marketing.

• **SMS and MMS:** Short Message Service (SMS) and Multimedia Message Service (MMS) are
systems that enable brands to send texts or rich media (graphics, video, audio) to customers.

- **Location-Based Marketing (LBM)** Location-based marketing technologies allow one to spot a smartphone owner’s location as well as his or her personal data, gender, age, profession, preferences, hobbies, etc. Such technologies open up new opportunities for developing marketing campaigns aimed at a specific consumer.

- **Near Field Communication (NFC)** is a technology of wireless high-frequency short-range communication that ensures the exchange of data between devices at a distance of a few centimetres. It combines the interface of the smart card and reader into a single device. In other words, NFC helps a common user to move a contact or video clip from one smartphone to another just by touching these devices as well as to make contactless payments by replacing bank cards. Even now smartphones with NFC can replace bank cards, transport tickets, discount cards and access smart cards, movie tickets and parking cards.

We consider it necessary to mention a few other mobile marketing tools – brand promotion in social networks, augmented reality (AR) and interactive voice response

**Interactive Voice Response**
Interactive voice response is one of the oldest mobile communication channels; marketers started to use it as soon as mobile phones were available. Nowadays, the following two channels are widely used: a free number (the initial code for Russia is “8 800”) and interactive voice services. Studies show that if companies begin to use the free number, the number of calls increases because people prefer free calls, even considering the affordable rates of mobile operators.

Interactive voice response enables the customer support service to save significantly and to provide the potential buyer with necessary information.

- **Marketing in social networks.** Administering a group or a page in social networks allows one to attract users and establish informal contact rather quickly. In social networks people prove to be more open than in real life and more willing to communicate and share information. The technologies of access to social networks constantly widen the range of functions for collecting and processing different information with the use of mobile devices. Combining social networking with mobile technologies creates an innovative channel for advertising message distribution.

- **Augmented Reality (AR).** Augmented reality is a technology that allows one to overlay digital information on top of a physical world in real time with the help of computer devices such as tablets and smartphones and software for them. Augmented reality technology is actively used for marketing purposes, especially for the promotion of youth brands and children’s brands. Mobile augmented reality allows one to read virtual information via smartphones and this is one the main advantages for mobile marketing.

**4.2. ADVANTAGES OF MOBILE MARKETING**
Mobile marketing has obvious advantages in comparison to traditional types of marketing communications such as advertising, public relations and sales promotion:

1. Prospective audience. Users of today's mobile devices are active and solvent.
2. Immediacy. For example, an SMS can be sent instantly to hundreds of thousands of customers located in different cities and even countries.
3. Interactivity. A distinct advantage of mobile marketing is instant feedback from the target audience as well as constant consumer involvement in the dialogue with the brand.
4. Efficiency. For example, SMS-ing almost always involves feedback, e.g. a call-back or an SMS code word; this activity makes it possible to get high accuracy on an efficiency estimate.
5. Low cost. The cost of mobile marketing technologies is often lower or comparable to "traditional" methods.
6. Selective effect for the target audience based not only on the standard parameters of the target audience’s identification, but also on the specific consumer’s preferences and habits, his/her behavioural patterns, typical leisure time, interests, recent actions on the Internet, etc.
7. Combination of different tools. Mobile marketing technologies perfectly combine with each other as well as with other marketing communications tools that allow one to organise an integrated, catchy campaign.
8. Company image. The customer associates the company with innovative technologies and modern communication methods, which is essential for most organisations.
9. There are no legislative limitations. No legal restrictions are imposed on tobacco and alcohol advertising in Russia through mobile marketing.

10. 24/7 availability. A mobile phone is the only thing that a person has with him or her constantly, so it is safe to say that the target audience is available to act at any time of the day, seven days a week.

4.3. THE TRENDS IN THE GLOBAL MARKET FOR MOBILE MARKETING

It is necessary to mention the main trends in the global market for mobile marketing, stated by J'son & Partners Consulting (J'son & Partners Consulting, 2016) experts:

- Dissemination of new operating systems: Android, iOS, Windows;
- Increasing influence of mobile social networking on mobile marketing;
- Tablet computers are booming;
- Development of mobile payment systems and mobile banking;
- Growth in mobile devices and increased share of smartphones.

The following factors can be considered as the barriers to the market development of mobile marketing in Russia:

- Technical constraints on SMS and MMS advertising. Based on the technical parameters of a message a cell phone can hold a limited number of characters and SMS messages cannot contain multimedia (images, audio, video); this is not suitable for every advertising campaign.
- Legal restrictions (Federal Law of the Russian Federation of July 21, 2014 N 272-FZ (the Law on "Communication")). The main requirement is that a mobile phone user has to give consent to receiving mailings.
- Low advertiser involvement.
- The negative economic situation in the Russian Federation.

5. PECULIARITIES OF PROMOTING FOREIGN HIGHER EDUCATION INSTITUTIONS IN A MOBILE ENVIRONMENT

A recent study by Purdue University (Purdue University, USA) on the necessity of mobile applications for students showed a clear preference for mobile applications compared to the conventional mobile version of the university site.

A report by the consulting centre Ruffalo Noel Levitz is also of interest; it showed the following: 70% of university students visit the official website of their university through mobile devices, and 73% are interested in institutions with official mobile applications that provide easy access to the catalogue of courses and relevant information. (Quinn P., 2013)

Applications can be used not only to obtain additional and necessary information, but also as the basis for online courses. Students of three master's programmes at Saint Mary's University of Minnesota are provided with iPad tablets with an application which contains all courses in electronic form, and consulting work with teachers is optimised along with submission of reports and course work projects.

Many foreign universities apply mobile marketing technologies using an unconventional approach. For example, OCAD – a university of art and design in Canada – offers students and teachers a free app for smartphones with a function for calling the police or an ambulance in case of emergency. A Carleton University mobile application contains a function for monitoring student attendance.

A decision made by the University of British Columbia is of special interest. Its international research and teaching centre is consistently ranked among the top 40 universities in the world. The mobile application of the university is fully integrated with the information system of the university. There is a constant exchange of information with potential entrants and later students and graduates through a serial mobile application devised for such issues as submission of documents for admission, student adaptation at the university, the educational process and long-term relationship building with alumni.

The University of Dalhousie has engaged in an innovative approach called App Challenge. This is a student competition for creating mobile applications. A University of Toronto project is also quite interesting in this regard: students develop and constantly improve the university's applications and learn to develop their own projects.
6. THE INTERNATIONAL BIGGEST PLAYER BLACKBOARD IMPLEMENTING THE MOBILE MARKETING COMPLEX

Unlike Russian universities, where mobile app development is just emerging, almost all leading foreign universities have their own apps. A major foreign market player, Blackboard (Figure 2), is a provider of commercial systems for distance learning. One such system is an application designer that allows universities to develop a mobile app with their own colours, icons, tool set, and access to iTunes and Google Play. (Borovinsky A., 2016)

A list of tools provided by the Blackboard app designer:

- News from an RSS feed. It is easy to connect to existing university sites without extra creation of news for mobile devices.
- Campus map with various marks.
- Contact information. Contacts may contain a telephone number with a one-click function, rapid transition to e-mail writing and location of the department building on the map.
- YouTube video file catalogue.
- An app for distance learning.
- Access to Dropbox.
- Course schedule. There are no groups as every student may choose any course. So the schedule presents a list of courses and times and map links to locations.
- University events calendar.
- Link to any website (e.g. the library site).
- Photo gallery.

![Figure 2. Possibilities of the Blackboard Platform](www.blackboardmobile.com)

7. MAIN RECOMMENDATIONS FOR MOBILE MARKETING STRATEGY IMPLEMENTATION AT HIGHER EDUCATION INSTITUTIONS

In the future, more and more entrants and students will use the Internet only through mobile devices, so universities should analyse their activities in the field of mobile marketing attentively:

- Creation of a mobile version of the site
- Implementation of mobile advertising campaigns
- Creation of a mobile application
- Optimisation of marketing for mobile devices in social networks

The main recommendations for the implementation of mobile marketing strategies for higher
education institutions are presented below. Universities need to take the following fundamental steps.

7.1. IMPLEMENTATION OF A MOBILE VERSION OF THE SITE

The trend is that if a university does not have a mobile version of its site, there is a significant loss of solvent young applicants. The presence of a mobile version of Internet resources is not a trend, but simply a necessity. A mobile version is a version of a website adapted for viewing on mobile devices (tablets, mobile phones, smartphones and other gadgets).

A mobile version of the site has a number of distinguishing advantages:

- Search engines use a mobile search for mobile devices, so the mobile version will be ranked higher.
- A mobile site is downloaded more easily because of the code size and the number of loadable items, which significantly reduces the costs for the user, and it reduces the amount of payment for mobile traffic.
- A mobile version is adapted for touchscreen technology for users of a regular mobile phone keypad.
- Compact content display.
- Mobile versions often include additional communication features aimed at specific target groups of visitors: calling, sending an SMS directly from the site, offering a route to the sales office, etc.

7.2. DEVELOPMENT OF A MOBILE APPLICATION FOR THE EDUCATIONAL INSTITUTION

The transition to content consumption from mobile devices presented a new challenge for universities’ information infrastructure. Users have been reluctant to use websites which are not optimized for viewing at least from tablets.

Recently, more and more Russian universities have experienced the necessity to launch specialized mobile applications under their own brands.

Today, having a convenient, user-friendly and effective mobile app is a must for any university.

The main advantages of a mobile application:

1. Considerable functionality

Mobile applications are much more functional and flexible than classical sites. They are faster and easier to connect to a network, they are extremely concise and, moreover, they allow one to use such necessary options as Bluetooth, geolocation, a contacts list, a camera, etc.

2. Positive consumer attitudes toward applications

More and more users think of the smartphone as the main device for communication and use of different services. And, consequently, users expect that the university has an application for Android or iOS.

3. Loyalty programmes

Users tend to be attentive to notifications and messages from mobile applications. Thus, mobile applications’ potential for creating loyalty and personalisation is very high.

4. Marketing research

An obvious advantage for marketers who examine consumer behaviour and preferences is the predictability of mobile application users’ actions and clear and reliable interpretation of these actions.

Opportunities for mobile applications as marketing tools in university promotion

- advertising education services
- developing a university brand – an app is one of the most efficient university positioning tools
- university event infotainment (open days, conferences, festivals, etc.) as well as enrolment campaigns
- the development of an applicant database and active interaction with it
- communication with the target audience and feedback organization; apps are the most practical and efficient way to be in touch with every applicant, student and lecturer
- loyalty programme realization and creation of customer communities

A university may use a mobile app not only as a marketing instrument but also as a mobile learning platform for users.
A mobile phone and its functional features allow one to organize the education process with the use of electronic textbooks, training courses and specialized files with educational information. Teaching aids are designed especially for mobile phone platforms.

The term “mobile learning” (m-learning) is relevant in the context of mobile and portable IT devices such as PDAs (personal digital assistants), mobile phones, laptops and tablets in teaching and learning processes.

The implementation of mobile technologies in education allows education process participants to move freely; expands the education process borders beyond an educational institution; gives disabled people an opportunity to study; does not require one to buy a personal computer or academic books, i.e. it is justified economically; due to modern wireless technologies such as WAP, GPRS, EDGE, Bluetooth, and Wi-Fi it is easy to provide students with educational resources; information is provided in a multimedia format. Thus, the expediency of using such modern communication means in education is obvious. (Golitsyna I., 2011)

7.3. THE USE OF MOSERS AS UNIVERSITY COMMUNICATION TOOLS IN THE MOBILE ENVIRONMENT

Nowadays, messengers are becoming the main form of communication online. A messenger is a specialised service that is able to transfer a great variety of content in real time instantly. Messaging has already become a popular technology for mobile marketing. Once devised only for personal communication, messengers are now transforming into information channels in the form of social chat channels. This brings universities closer to the target audience: the personalised interaction and the possibility of rapid communication builds trust and boosts loyalty to the higher education institution.

7.4. MAINTENANCE OF A HIGHER EDUCATION INSTITUTION’S PROFILE IN SOCIAL NETS

Every month 69 million people in Russia use the Internet; more than 80% of them are registered in social nets. Social networking sites are actively used in all spheres of society. The main reason users prefer to communicate in social networks is that geographical, social and age differences between people blur and even out. It should be noted that VKontakte is one of the most popular social networks in Russia and the most visited resource in the Russian internet segment.

VKontakte is still the leader among Russians and has 54.6 million active users (January 2015). VKontakte is followed by Odnoklassniki (Classmates), with a monthly community of 40 million users, and My World, with 25.1 million users, but these social media are beginning to lose ground and popularity. Classmates’ user base decreased by 1 million over the last year and My World lost 2.7 million users. Facebook is growing and is in third place; it now has 24.2 million users. It is followed by LiveJournal, with 16.6 mln users, Instagram, with 13.3 mln users, and Twitter, with 8.4 million users. (Frolova E., 2016)

The differences between the target audiences of VKontakte and world leader Facebook are blurring. Previously it was thought that the site VKontakte has a younger and larger community that is interested in entertainment content, while Facebook is used more for informative purposes. Now Facebook is simplifying its functionality, and the presence of the Russian version adds popularity to it each year. As a result, differences in the communities have become insignificant.

In order for a particular education institution to determine what kind of social network is better as a promotion platform, it needs to figure out the target audience’s demographics as well as the gender, age, social status and level of education of the users of particular social media.

Maintaining groups and pages on social networks allows a university to attract users to its activities and to quickly establish informal contact. People are more open than in real life, more willing to communicate and share information in the social network environment.

Key promotion opportunities for a higher education institution in social networks

The opportunities are as follows:

• Maintaining a group settles a wide range of advertising and marketing issues and promotes the formation of a favourable image of the higher education institution.

• A social network group implies direct communication with the target audience – applicants, students, alumni.
• The university can conduct market research and find out users’ opinions on current issues and their wishes and preferences.
• The group provides the institution with the opportunity to inform many users immediately about new courses, open days, and admission campaign start dates.

We would like to suggest that higher education institutions pay particular attention to Instagram. It is one of the largest social applications in the world; its popularity in Russia is constantly growing. According to comScore, the Russian Instagram platform currently has more than 9 million users (15+, in the whole of Russia). TNS estimates that this mobile application has 5.5 million users (12-64, cities 700k +) (ComScore, 2015).

Instagram is the world leader in terms of audience engagement, surpassing Twitter and Facebook, and this gap is growing. Every day around the world 70 million new photos are published on Instagram which receive 2.5 billion likes. (ComScore, 2015)

Instagram is the leader among social platforms in the rate and extent of growth of youth and female user coverage. For these segments, visual content has become a new and universal language of expression and communication, and viewing a photo report increasingly substitutes for reading, public correspondence and reading friends’ profiles. Maintenance of an interesting and current Instagram profile creates a modern image for the educational institution and projects this image in other social networks.

Mobile marketing in Russia is one of the most dynamic areas of marketing communications today. Companies create mobile versions of websites and advertising budgets include mobile advertising costs; agencies offer interesting options for advertising campaigns using new technologies. There is an increase in the number of companies specialising in mobile marketing.

8. CONCLUSION

In the coming years, higher education institutions, whether public, municipal or private, will require the implementation of the most advanced educational and marketing methods and technologies that not only provide high-quality and competitive higher education, but also offer marketing opportunities. Mobile marketing is one such technology that has not yet received an adequate level of development and implementation and has great potential for innovation in university competitiveness.

We suggest the following definition for mobile marketing: a combination of measures aimed at the promotion of goods, services or ideas by providing content and interactivity with consumers, carried out with the help of mobile devices and gadgets. A list of mobile marketing tools that are currently widely used includes: mobile video, display or audio ads, mobile websites, mobile applications, quick response codes; mobile search marketing, SMS and MMS, location-based marketing, near field communication (NFC), marketing in social networks, and interactive voice response.

The implementation of a mobile marketing strategy, in our opinion, should be the basis and an integrating element for the information and communication interaction between modern universities and target groups of consumers. A mobile marketing strategy includes the following main stages: analysis of the current situation; establishment of the goals and tasks of the mobile marketing; their comparison with the goals of marketing communications; definition of target audiences; development of mobile marketing tactics; formulation of communication messages; selection of tools; definition of the budget; implementation; and the final stage, performance evaluation.

Statistical data presented in this article showing the rapid growth of mobile content consumption by the target audience of the university allowed us to characterize mobile marketing tools as an essential marketing reserve. Modern applicants are pretty particular about the scope and content of marketing information, have good communication skills in the digital environment and are accessible through use of innovative marketing communications. Russian educational institutions, on the contrary, prefer traditional low-budget communication methods and technologies that can and should be upgraded through the introduction of mobile marketing strategies.

Analysis of mobile activities at foreign universities showed that higher education institutions actively use the opportunities of digital communications; moreover, almost all universities have mobile applications, actively manage communities in social networks, and provide opportunities for interactivity between the student and the teacher, permitting the organization of fully fledged
information and communication support of educational activities.

Regarding improvement of the effectiveness of marketing communication interaction between universities and their target audiences, we suggest primary solutions, such as creating a mobile version of the website, implementing mobile advertising campaigns, creating a mobile application, and marketing optimization in social networks for mobile devices. Practical implementation of this approach will ensure continuous marketing interaction between the university and the target audience and bring the university’s marketing and communication interaction to a new level.

It is obvious that the era of mobile marketing has come. In these circumstances, universities face the need to develop a balanced approach to their marketing plans and build strategies for marketing communications using mobile technologies for promotion as the most effective tool of influence on the target audience.

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DIGITALISATION: THE FUTURE OF HEALTH CARE

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Abstract

Purpose
The health care industry is way behind other industries in adopting digital technology, even though there have been rapid advances in big data and data analytics. The health care industry has adopted the first two generations of technology changes with ease but is finding it difficult to adopt the third level of digitalisation due to several factors. There have been rapid advances in the last few decades in health care informatics – electronic health record systems, genomics, remote diagnostics, wireless technologies, wearables, context-aware computing and cellular technologies that are changing the scene of the health care industry. Big data and data analytics will change the health care delivery system if adopted. The convergence of these technologies will result in a health care delivery system far ahead of customer expectations.

Approach
The objectives were achieved by secondary research. The main method for research was to identify high technology companies in the IT sphere and analyse the research work being done and the products or services developed by these companies in health care by using big data and data analytics. Do they have any commercially viable products or services and how are they useful to the health care industry? Work done by major research institutions on health care was analysed to arrive at the findings. Scholarly articles on health care digitalisation and relevant books were also referred to.

Findings
The benefits of big data are entirely dependent on how the electronic health record system develops and integrates itself into the routine of various hospitals, health care providers, doctors, diagnostic labs, etc. Genomics is being billed as a disruptive technology and game changer in health care. Genomics will transform the health care industry like never before. The pharma industry is making steady progress in “pharmacogenomics”, which means developing medicines to suit individual patients’ genetic profiles. This will ultimately lead to custom-made health care through digital technology. The new innovations in diagnostic wearable devices with sensors along with big data and big data analytics supported by context-aware computing in real time will lead us to global health care and health delivery models and hospitals which will be highly cost-effective. Digital technology can be used for predictive, preventative health care. Digital technology, with the help of big data and data analytics, will be able to provide remote health care.

Research limitations/implications
Further research can be undertaken on genomics data banks from cities to nations to the whole planet and on prediction of epidemics through data mining and analytics, gene-based therapy based on hard data, pharmacogenomics, predictive health care based on data analysis or genomics, preventative health care through analytics, surgery robotics, and context-aware health care at home.

Practical implications
Through digitalisation and data analytics health care providers will not be selected by patients based on country, city or geographical location but based on the expertise the patients require. The other determinants could be the cost, convenience of health care delivery and quality. The selection of a health care provider will take place at a global level as health care will transform into a world hospital offering the lowest cost anywhere at any time.

Social implications
Health care will become available to the underprivileged at an affordable cost in any part of the world. Digital technology will make it possible to have home-based health care with real-time expert
advice from anywhere in the world. Corporations and NGOs may look to the underprivileged to support remote health care.

Originality/value
The world is facing a serious health crisis. New diseases are infecting human beings. This research work provides direction in the areas where digitalisation, with the help of big data and data analytics, can make the world a healthy place for all to live in.

Keywords: Health care, big data, data analytics, genomics, cost reduction

Category of paper: Technical

1. INTRODUCTION
The last few decades have seen the advent of digital technology in a big way. Businesses and companies are adopting digital technology for growth. Companies, including those in the health care industry, will have to go digital because consumers all across the world are going digital. The health care industry has adopted the first two generations of technology changes with ease but is finding it difficult to adopt the third level of digitalisation due to several factors, including privacy issues and apprehension about customer acceptance.

Health care executives are now faced with a situation in which they need to identify digital technology and processes to get onto a better health care and growth path and stay ahead of the competition.

Health care has gone through a sea change due to new technologies and the main task before health care managers is how to grow and gain a better market share across the world and provide better health care at a lower cost. The question of how to grow and gain a market share with better health care is repeatedly asked by health care managers. The answer in fact lies in digitalisation.

The question is if slow technology adoption in the health care industry may be one of the reasons for escalation of the cost of health care across the world.

Any corporate health care strategy has to consider a changing world in terms of the complex and high-end technology available and of equal importance is early adoption by companies in using the latest digital technology in health care or outsourcing to suit their requirements. Technology can no longer be regarded as one department’s product in the health care industry but has to take the lead just as any process to deliver the best health care.

In the present health care business scenario, endogenous theory is becoming more and more relevant. Technology will be driving health care growth, supported by technically skilled human capital. Countries across the world have to produce more health care professionals and adopt the changing trend in technology more quickly than others to cut costs and provide better health care.

It may also be true that governments may have to change privacy laws to enable the health care industry to adopt the latest technology and carry out complex health care processes from anywhere in the world to anywhere in the world.

Berland (2015) of Intel Healthcare, in the article “Healthcare Innovation Barometer Infographic”, reveals that many people are willing to share their medical data anonymously to lower the cost of health care. With this information, drug development can be fine-tuned enough to meet the needs of the individual and not just the average person.

The biggest problem in health care management with big data and data analytics is privacy laws and if people are willing to share their data, it will open up a new chapter for health care digitalisation.

There were always health care challenges in the past and technology has always found tools to handle them and provide top-of-the-line health care.

There have been rapid advances in the last decades in genomics, health care informatics, remote diagnostics, wearables, the Internet, wireless technologies, context-aware computing and cellular technologies. The health care industry will have to accept the fast-changing scene. The convergence of these technologies will result in a health care delivery system far ahead of customer expectations.

Networked diagnostic devices are replacing manual operations for diagnostics and a patient can be digitally monitored from home rather than being brought to a hospital.

Behringer (2015), in the article “The digitalisation of healthcare economy”, stated that in the hospital of the future information technology (IT) will play a central role – from the management of administrative and medical data to networking with other hospitals to obtain fast access to diagnostic results, etc.
A combination of big data, database management systems and cloud computing supported by context-aware computing and business/predictive analytics is on the verge of changing the way health care will be provided in the future.

Stuart (2015), in the article “Digitalisation: enabling the future of healthcare”, stated that in addition to placing the focus on quality and care management, digitalisation also helps to develop health management insights via analytics, contract and demand management, and even fraud management so that health care can ensure customers are being charged at the right time, for the right price, every time. Through these digital initiatives, health care is improving the customer experience and creating material change in its business, in addition to shaping the changing health care landscape.

One of the biggest hurdles in digitalised health care is insurance companies. They have not yet woken up to the fact that digitalised health care as a reality is almost here. Insurance companies will have to include reimbursement for remote digital health care, which may include diagnostics, consultations, monitoring, and surgical care.

2. THEORETICAL FRAMEWORK OF THE RESEARCH

The following theories were taken into consideration while conducting the research.

A study by Basu, Fernald, and Shapiro (2001) revealed that advances in technology are the only source of permanent increases in productivity.

Baumol (1967) and Nordhaus (2006) suggest that economic studies have shown that technologically stagnant sectors experience slow productivity growth and, therefore, above-average cost and price increases.

According to Tassey (2005), the closest traditional economics comes to recognizing the role of technology is so-called “endogenous growth” theory. Endogenous growth theory is an economic theory which argues that economic growth is generated from within a system as a direct result of internal processes. More specifically, the theory notes that the enhancement of a nation's human capital will lead to economic growth by means of the development of new forms of technology and efficient and effective means of production.

Salber, Dey, and Abowd (1998) define context-aware to be the ability to provide maximum flexibility of a computational service based on real-time sensing of context.

Hull, Neaves, and Bedford (1997) define context-aware computing as the ability of computing devices to detect, sense, interpret, and respond to aspects of a user's local environment and the computing devices themselves.

Feldman, Martin, and Skotnes (2012) stated in the article “Big data in healthcare: Hype and hope” that volume (scale of data) refers to the management of the amount of data, usually referred to in terms of terabytes or petabytes of data. It involves management of data storage.

Variety (different forms of data) means that the format of data can be structured, semi-structured and unstructured.

Feldman, Martin, and Skotnes (2012), in the article “Big data in healthcare: Hype and hope”, stated that velocity of data means the frequency of data that is produced, processed, and analysed.

Clifford (2008), in the article “How do your data grow?”, stated that veracity refers to the quality, relevance, predictive value and meaning of data.

In the same article, Clifford mentioned that the value of data refers to information’s worth to various stakeholders / decision-makers.

Gartner (2009), in the paper “Context-Aware Computing Will Provide Significant Competitive Advantage”, defines context-aware computing as the concept of leveraging information about the end user to improve the quality of the interaction. Emerging context-enriched services will use location, presence, social attributes, and other environmental information to anticipate an end user's immediate needs, offering more sophisticated, situation-aware and usable functions.

3. RESEARCH METHODOLOGY

This research was not empirical. The research methodology followed was secondary research.

The research started with an extensive search on the internet for global-level high technology companies that offer products or services in the big data and data analytics sphere. The next process was to research these pre-identified companies’ work or research papers published in the health care sector. The products or services offered by these companies in the health care sector were also
researched.

Scholarly articles and reports on digitalisation of health care from academia, corporations, consulting firms, insurance companies, government laboratories, the WHO and government organisations were also researched.

All the work mentioned above was combined to create a paper in order to be able to explain the future of health care through digital technology.

4. ANALYSIS OF THE RESEARCH RESULTS

It is a well-known fact that use of new technologies reduces costs, improves efficiency, and enhances consumer satisfaction and experience. In the near future, a patient’s medical data will be available at any given point in time anywhere in the world so that he/she may seek medical advice or remote-controlled medical intervention, including surgery. This will change the entire landscape of the health care industry.

<table>
<thead>
<tr>
<th>S. No</th>
<th>New digital technology</th>
<th>Highlights</th>
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<tbody>
<tr>
<td>4.1</td>
<td>Big data and health care</td>
<td>Health care is probably one of the most data-intensive industries. Basically, there are four main sources generating all the health care data: medical care providers, public and private payers, ancillary service providers – from pharmacies to laboratories – and health care consumers.</td>
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<tr>
<td>4.2</td>
<td>Data analytics in health care systems</td>
<td>Health care providers and payers can garner new insights across a spectrum of applications ranging from better personalized individual care to predictive models for large population cohorts.</td>
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<td>4.3</td>
<td>Electronic health records (EHR)</td>
<td>Big data benefits are entirely dependent on how the electronic health record system develops and integrates itself into the routine of various hospitals, health care providers, doctors, diagnostic labs, etc.</td>
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<td>4.4</td>
<td>Genomics</td>
<td>It is being billed as a disruptive technology and game changer in health care. Genomics will transform the health care industry.</td>
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<td>4.5</td>
<td>Personalized health care</td>
<td>Health care is moving towards individual custom-made health care, including in preventative care.</td>
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<td>4.6</td>
<td>Health wearables and prevention</td>
<td>Individuals will be able to monitor their health parameters on a continuous basis with health care professionals and seek online remedies.</td>
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<tr>
<td>4.7</td>
<td>Early detection</td>
<td>Genomics supported by EHR with predictive data analytics will be able to create algorithms that predict major types of diseases, including cancer. Big data may be the greatest weapon to wield in the global fight against Alzheimer’s.</td>
</tr>
<tr>
<td>4.8</td>
<td>Cost reduction</td>
<td>The new innovations in diagnostic wearable devices with sensors along with big data and big data analytics supported by context-aware computing in real time will lead us to global health care and health delivery models and hospitals which will be highly cost-effective.</td>
</tr>
<tr>
<td>4.9</td>
<td>Remote health care management</td>
<td>Data analytics will be able to manage health care and patients can stay at home and out of hospital beds. They will still get almost the same clinical care.</td>
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Table 1
4.1 BIG DATA FOR HEALTH CARE

It has been a long-practiced approach, still relevant today, that health care is an individual process and generally does not have pooled data for several reasons, including privacy laws. Big data and analytics are now on the verge of changing all that and the individualistic approach to health care. The data is stored in a highly classified manner and it is extremely difficult to access.

IBM (2016), in the article “Bringing big data to the enterprise”, mentioned that every day, we create 2.5 quintillion bytes of data. Rich (2013), in the article “Redesigning healthcare. New delivery initiatives include ACOs, walk-in clinics, medical homes”, quoted Karen Davis, a health policy professor at Johns Hopkins University and a long-time Washington policy leader, as having said that the innovation centre has faced challenges collecting data that is strong enough to support expanding its ideas broadly across Medicare and Medicaid.

Maniyika, Bughin, Dobbs, Roxburgh and Hung (2011), in the article “Big Data: The next frontier for innovation, competition and productivity”, stated that if US health care were to use big data creatively and effectively to drive efficiency and quality, the sector could create more than $300 billion in value every year. Two-thirds of that would be in the form of reducing US health care expenditure by about 8 percent. In the developed economies of Europe, government administrators could save more than €100 billion ($149 billion) in operational efficiency improvements alone by using big data, not including using big data to reduce fraud and errors and boost the collection of tax revenues. And users of services enabled by personal-location data could capture $600 billion in consumer surplus.

It has been found (Commonwealth of Australia report 2013) that about 90% of data today was created in the last 2 years. It has been calculated that the production of data will be 44 times greater in 2020 than it was in 2009.

It has been stated (Siemens 2016) in the article “Big data in the healthcare industry” that basically, there are four main sources generating all this health care data: medical care providers, public and private payers, ancillary service providers – from pharmacies to laboratories – and health care consumers. The challenge is not just in storage and access, but in making this data usable.

Marr (2015), in “How Big Data Is Changing Healthcare”, mentioned that big data in health care is being used to predict epidemics, cure disease, improve quality of life and avoid preventable deaths. With the world’s population increasing and everyone living longer, models of treatment delivery are rapidly changing, and many of the decisions behind those changes are being driven by data.

4.2 DATA ANALYTICS IN HEALTH CARE SYSTEMS

By gathering and analysing the many varieties of data, including medical records and traditional clinical as well as new genomic and consumer-generated types, both providers and payers can garner new insights across a spectrum of applications ranging from better personalized individual care to predictive models for large population cohorts.

It has been found (Intel 2016) in the article “Health IT: connecting patients, care teams, and data” that the amount of existing and new data flowing through today’s health care model is enormous and growing. The untapped potential of that data is even greater.

4.3 ELECTRONIC HEALTH RECORDS (EHR)

Shaffer and Craft (2015), in the article “Hype Cycle for Healthcare Provider Applications, Analytics and Systems”, mentioned that with EHRs increasingly in place, the future will be dominated by technologies that enable real-time "intelligent" operations, manage population health, engage and influence patients, and enhance clinicians' cognitive abilities. A "revolution" has defined the last 10 years of health care IT, the authors says.

The benefits of big data are entirely dependent on how the electronic health record system develops and integrates itself into the routines of various hospitals, health care providers, doctors, diagnostic labs, etc.

Gartner (2015) says that EHR adoption is a "trigger" for data analytics, improved care management and other innovations. However, these initiatives will take time, the analyst firm notes in a recent report, "Hype Cycle for Healthcare Provider Applications and Systems."

4.4 GENOMICS

An organism’s complete set of DNA is called its genome as per the National Human Research
Institute of the USA. It has been concluded (National Human Research Institute of the USA, 2016) that the role of genetics in health care is starting to change profoundly and the first examples of the era of genomic medicine are upon us.

As per medical science every ailment has a source in our genes. It has been a long-time practice in the health care industry to take genetics into consideration for birth defects and also some life-threatening diseases. In such a way, the industry has also been able to identify certain diseases.

Data analytics will drive the whole process of genomics. This will be one of the most integrated and complex data analytics exercises undertaken on the planet and it will include entire health care service providers from hospitals to doctors’ clinics to diagnostic labs and individuals and groups of individuals with similar genomics in a city, state or country or the whole planet. Researchers will be able to establish what changes in genomics cause diseases and the pharmaceutical industry will be able to develop genomic medicines.

4.5 PERSONALIZED HEALTH CARE

Health care is definitely moving towards individual custom-made health care, including preventative. Genomics will guide the entire health care industry with the help of data analytics and will change the way health care is delivered in the foreseeable future.

Patients have been going through screening and diagnostic tests for quite some time and getting medicines prescribed by doctors available on the shelf with no distinction among patients for their genetic differences. The pharma industry is making steady progress in “pharmacogenomics”. In simple terms, this means developing medicines to suit individual patients’ genetic profiles. This will ultimately lead to custom-made health care.

4.6 HEALTH WEARABLES AND PREVENTION

Digital technology is already playing a vital role in the prevention of health-related issues. Digital wearables are redefining preventive health care for diabetes, blood pressure, etc. Wearable devices equipped with sensors record live data and transmit it via an app to the health care provider. This will lead to better disease management, including preventive health care.

People will be able to use wearables and connected devices to manage their well-being through the analysis of an entire day’s data on basic parameters and the corrections required the next day to remain in the optimum health parameters.

Wearables and context-aware computing with sensors will not only be useful for acute health conditions but will become health gadgets worn by all.

4.7 EARLY DETECTION

EHR could turn out to be a major tool for big data analysis to predict or detect several diseases. Certain EHR data, if analysed by analytics, may provide conclusive symptoms of several diseases long before they attack the body. Even now, breast cancer can be predicted long before any symptoms of the disease.

Milstein and Jha (2013), in their paper “Healthcare's "Big Data" challenge”, concluded that the use of real-time big data analytics will result in early and accurate detection of illness and lower costs.

Ramachandran, Girija, and Bhuvaneswari (2014), in the article “Early Detection and Prevention of Cancer Using Data Mining Techniques”, mentioned that a novel multi-layered method combining clustering and decision tree techniques to build a cancer risk prediction system has been proposed which predicts lung, breast, oral, cervix, stomach and blood cancers and is also user-friendly and time and cost-saving. This research uses data mining technology such as classification, clustering and prediction to identify a potential cancer patient.

Ahmed, Emran, Jesmin, Mukti, and Rahman (2013), in the article “Early detection of lung cancer risk using data mining”, stated that by using prediction tools for significant patterns a lung cancer prediction system has been developed. This prediction system should prove helpful in detecting a person's predisposition to lung cancer.

It has been recognised by Lockheed Martin (2015), in the article “Data Analytics – Identify Illness before Your Body Does”, that human beings are complex. Each of us carries a unique genome, comprised of DNA, genetic mapping, hereditary information and biological characteristics. In other
words, humans are made up of millions of individual data points. Now, as data analytics technology evolves, we can harness and sequence this data to identify trends, detect disease, predict medical complications and ultimately deliver more comprehensive and affordable care.

As genomics moves forward early detection will become reality.

Kar (2013), in the article “IBM Wants to Predict Heart Disease through Big Data Analytics”, mentioned that it is just a matter of a few years until health attacks will be predicted in advance by data analytics. IBM is already working on this.

Knowledgent (2015), in the article “Applying Big Data to One of the World’s Biggest Problems: Alzheimer’s Disease”, says that Alzheimer’s is a global crisis. Nearly 44 million people worldwide suffer from dementia, and this number will spike to 115 million by 2050. The crisis is not particular to the rich world. Nearly 60 percent of the burden of dementia is in low and middle-income nations. And this percentage will rise. Right now, for the first time in human history, we have the volume of data and the analytical tools to begin this project.

Stanford Medicine (2015), in the article “Precision health: Predicting and preventing disease”, lays the groundwork for such a system, which will be able to quickly analyse information from large patient databases, medical literature, mobile monitoring and patients’ real-life experiences with drugs, among other sources, to provide an evidence-based approach to medicine that has not been possible before.

4.8 COST REDUCTION

Evidence-based medicine will certainly lead to cost reduction as patients will get the treatment for the disease evidenced or prevention needed and hence there will be no scope for trial and error.

Peleg and Tu (2006), in the research paper “Decision support, knowledge representation and management in medicine”, highlighted cost reduction as a major advantage of big data analytics.

Home-based health care delivery will drastically reduce the cost.

Genomics, when it becomes part of regular health care, will reduce the cost of medicine and health care. Genomics will enable gene-based therapy, which will be very effective, and the treatment period will be reduced, including post-treatment. This will bring down the cost.

4.9 REMOTE HEALTH CARE MANAGEMENT

In the very near future the way an individual visits and interacts with health care professionals is going to change through telemedicine. Wearables will continuously record the health data of patients at home and transmit it to the cloud. The data thus transmitted will be analysed through data analytics with existing DBMS in sync with the transmitted data and feedback will be sent to health care professionals in real time. Health care professionals, health care service providers, diagnostic labs, and emergency services will receive their patients’ data in real time and they can then decide the next course of health care in real time as well. The analysed data will come seamlessly and hospitals will be able to identify any health issues and take corrective actions.

Intel (2016), in the article “Health IT: connecting patients, care teams, and data”, states that data analytics can manage care and patients can stay at home and out of hospital beds. They will still get almost the same clinical care. Context-aware computing will play a major role in this area with the help of sensors which will continuously transmit the live data for analysis through data analytics.

In the same article, Intel mentioned that one of the most promising areas of innovation and transformation in health care is the move to distributed care. By creating a patient-centred network of intelligent, connected devices that spans across the home, workplace, community, and the mobile spaces in between, data capture and analysis and communication between patients and their care team can all be enhanced and harnessed to deliver more effective health care to more people at lower cost.

In the home, this will be driven by new types of consumer medical devices and smart home connectivity and features. In the workplace and the community, new mobile devices and services including kiosks will be available. And for persistent real-time data and connectivity, new purpose-built and general purpose devices will fill in critical gaps.

Bardram (2004), in the paper “Applications of context-aware computing in hospital work – examples and design principles”, found that a context-aware hospital bed will know who is using it and what and who is near it. The bed knows the nurse and the medicine tray and will display relevant information as
per the context. A context-aware medicine tray can remind the patient or nurse when the particular medicine is to be taken.

5. CONCLUSIONS
The conclusions of the research are as follows.

1. Electronic health records will replace all manual records and will ultimately create big data for the population to provide better health care to all. Governments across the world will have to change health-related privacy laws to enable the creation of big data.

2. Genomics will take the front seat in future health care and the whole population will have their personal genomics card or data for better health and preventative care. This will open the doors for personalised health care through pharmacogenomics and genomic medicine.

3. Health-related wearables will become an absolute necessity and people will monitor their health parameters on a continuous basis and take preventative measures or remedial measures without any wastage of time.

4. Future health care delivery will take place more at home than in hospitals as the remote care delivery network becomes technology-driven. Remote care health delivery is bound to expand due to the increase in internet connectivity and innovation in wearable and consumer-friendly health care instruments and portable machines supported by big data and data analytics.

5. Health care providers will not be selected by patients based on country, city or geographical location but based on the expertise the patients require. The other determinants could be the cost, convenience of health care delivery and quality. The selection of a health care provider will take place at a global level as health care will transform into a world hospital offering the lowest cost anywhere at any time.

6. Big data, data analytics, genomics and EHR will be able to predict a major epidemic long before it actually arrives and, similarly, individuals will be able to get forewarnings of diseases likely to afflict them in the future.

7. The cost of health care is likely to come down drastically through the use of technology.

8. The brick and mortar model of health care will remain similar to what we have today in terms of highly specialised hospitals and specialised diagnostic labs, but a huge number of health care professionals will be sitting in their offices and not going around brick and mortar hospitals. Health care professionals will be monitoring patients’ data continuously and advising them live on what needs to be done.

9. Health care will follow a model where brick and mortar hospitals will remain but consumers will receive more and better options for health care at lower costs through technology at home. Brick and mortar hospitals and diagnostic labs will still be relevant because a sizable population of health care seekers will still need the human touch in health care to feel secure. It will take some time for seniors to become convinced that health care can be provided digitally and hence they will continue to prefer the brick and mortar model.

10. The technological evolution of the last few years has been like nothing ever seen before. The advances in robot technology, precision processing, remote-controlled computer-assisted manufacturing, and the precision with which space and missile technology works provide enough assurance that the time is not far away when a robot-assisted major surgery on any organ of the body will be conducted by an expert surgeon thousands of miles away from the patient’s location. The only question that remains is whether the robot will be able to replicate the art of an expert surgeon in conducting the surgery, even if it has acquired the precision of a surgeon’s hand.

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