ISSN 1822 - 8402 EUROPEAN INTEGRATION STUDIES. 2009. No 3

ON THE PERSPECTIVES OF THE IMPLEMENTATION OF KNOWLEDGE TRIANGLE BASED ON LISBON STRATEGY IN ESTONIA

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Abstract

The article tries to reveal some of the reasons why the national strategy of research and development and first Version of Lisbon Strategy for the period 2005-2007 in Estonia has been quite efficient.

Since 2000, the European Commission has been measuring the innovation performance of countries with the help of the European Innovation Scoreboard (EIS) which is the instrument developed by the European Commission, under the Lisbon Strategy, to provide a comparative assessment of the innovation performance of EU Member States annually.

The *research problem* being solved in this article is: how to implement Lisbon agenda in Estonia (in 2008-2015). *The aim* of the article was to highlight the theoretical constitution of knowledge triangle based on Lisbon agenda and to analyse conception problems of knowledge triangle (academic research, infrastructure of higher educational institutions, innovative enterprise) concerning Estonian situation. In order to evaluate Estonia's perspectives in Lisbon strategy in 2008-2015 there was made analysis on ground of European Innovation Scoreboard. There are two main tendencies of the development of *Knowledge Triangle*: first, innovative rearrangements done in social sphere, in economy and in higher educational sphere to fulfil tasks from Lisbon strategy and, second, increase Estonian competitiveness. Another side of the knowledge triangle concerns creating new economic mechanisms (concrete business solutions) and creating new structure of institutions (rearrangement) to carry out new comprehensive and dynamic innovation model.

According to European Innovation Scoreboard 2008 Estonia's place among 27 EU states is 12th. This is clearly evident that Estonia is reaching the EU mean level for summary innovation index and has a relatively high growth rate for its level.

Keywords:

Research and development (R&D) and innovation policy, Lisbon Strategy on Growth and Jobs.

Introduction

Nowadays the research and development (R&D) and innovation policy is a top priority component of national economic strategy for several reasons. The innovation drives economic growth and job creation and is important not only for high-tech sectors but for all economic sectors.

The change taking place in the European economy and society presuppose a greater commitment to economic competitiveness in order to preserve the European welfare model (Rodrigues, 2002). For this end, the European Commission updated its proposals at the beginning of 2005, in order to promote economic growth and creation of jobs through a directed partnership between the EU and its member states (COM, 2005, 24).

Reasons of success in Lisbon Strategy implementation in Estonia are encouraged mainly by development of information society. The major factors that have affected and contributed to the evolution of Estonia's information society include economic factors (fast transformation to market economy), the active role of the public sector, growth of the technological competency, and socio-cultural factors (neighbourhood with Scandinavian countries, high general education level, relatively good language skills), fast development of information and communication technologies (ICT), skills and R&D competencies, inherited from the Soviet period (technology centres were mainly located at the Academy of Sciences and two bigger state universities).

The telecommunications and banking sectors are the cornerstones of the Estonian information society; they are also behind major initiatives dedicated to computer training and raising public awareness. Public-sector have had also important role. The governmental activities have not only been crucial in providing a favourable legislative environment but also in launching infrastructural projects and implementing innovative e-services (via application of public procurement for innovation). Public-sector developments have been strongly influenced by non-governmental organisation – foundation named "Tiger's Jump" (Tiigrihüppe Sihtasutus) which has been a project for computerization of all Estonian schools to 1998.

At the same time, as argued (Kalvet, 2009) the Estonian information and communication technologies manufacturing sector has become a part of the larger Nordic ICT manufacturing cluster. Leaders of ICT manufacturing-network are generally Finnish and Swedish companies, which have subsidiaries, affiliates, and joint ventures in Estonia.

Centre for European Reform has published Report on the Lisbon Scorecard VIII which says: "Estonian businesses and foreign firms with operations in Estonia are moving up the value-chain. Estonia also does well on some indicators of the knowledge economy, such as internet usage" (Barush, Tilford, Whyte, 2008).

The *research problem* being analysed in this article is: how Lisbon strategy is implemented in Estonia and what is perspective of the process (in 2008-2015). In order to estimate Estonia's perspectives in Lisbon strategy the analysis is made on ground of European Innovation Scoreboard (EIS) and of Community Innovation Survey (2006). In addition Estonian Government Action Plans for Growth and Jobs 2005-2007 and 2008-2011 is used as a source of information.

The aim of the article is to highlight the theoretical conception of knowledge triangle based on Lisbon strategy in Estonia.

Estonia's position at the European Innovation Scoreboard in 2002-2008

It is not a simple task to measure innovativeness of a state. To work out, apply and assess political measures for this it is imperative to produce certain measurement tools proper to object under consideration. We must take into consideration, firstly, that the number of proper indicators is limited. Secondly, the results of innovation are immediately visible. Thirdly, in short-time perspective preliminary results of innovation can be even negative.

As it was mentioned before since 2000, the European Commission has been measuring the innovation performance of countries with the help of the European Innovation Scoreboard (EIS). This is the instrument developed by the European Commission, under the Lisbon Strategy, to provide a comparative assessment of the innovation performance of EU member states annually.

In addition to the EU member states, EIS covers several other developed countries in respect to innovativeness. For the first time, Estonia landed up at the innovation scoreboard as a candidate state in 2002. In that version the EIS member states and candidate countries were strictly separated for the reason of deficient indicators of the latter. It will demonstrate dynamics of Estonia according to the changes "worded" by the scoreboard 2004: "falling further behind", 2005: "losing ground", 2006: "trailing", 2007: "catching up" and 2008: "moderates" (Heinlo 2009).

Since introduction of the EIS in 2000 its structure has undergone several substantial changes. It was launched as a composition of 17 indicators. Then the number of indicators increased to 20, later to 26 and finally to 29 which composition will be maintained for 2008–2010. The indicators were not only added but replaced as well depending on their availability and quality. At the same time, the way of grouping the indicators was changed. At first they were divided into four groups, then into five and finally in the fresh scoreboard for 2008 the two-level structure was introduced: 3 groups with 7 subgroups. (Heinlo, 2009).

The newest structure of the innovation scoreboard is presented in Table 1.

Table 1. Indicators for EIS, 2008–10 EIS dimensions and indicators

1 ***ENABLERS***
1.1 ***Human resources***
1.1.1 *Graduates at first stage of tertiary education in science, engineering, social sciences and humanities*
1.1.2 *Graduates at second stage of tertiary education in science, engineering, social sciences and humanities*
1.1.3 *Population with tertiary education*
1.1.4 *Participation in life-long learning*
1.1.5 *Youth education attainment level*
1.2 ***Finance and support***
1.2.1 *Expenditure on R&D in public sector*
1.2.2 *Venture capital*
1.2.3 *Credit towards the private sector*
1.2.4 *Broadband access by firms*
2 F***IRM ACTIVITIES***
2.1 ***Firm investments***
2.1.1 *Expenditure on R&D in business enterprise sector*
2.1.2 *Expenditure on information technology*
2.1.3 *Expenditure on innovation (excl. R&D expenditure)*
2.2 ***Linkages & entrepreneurship***
2.2.1 *SMEs*a *innovating in-house*
2.2.2 *Collaborating innovative SMEs (small and medium enterprises)*
2.2.3 *SMEs renewal (entries + exits)*
2.2.4 *Public-private co-publications*
2.3 ***Throughputs***
2.3.1 *European Patent Office patents*
2.3.2 *Community trademarks*
2.3.3 *Community designs*
2.3.4 *Technology Balance of Payments flows*
3. ***OUTPUTS***
3.1 ***Innovators***
3.1.1 *Technological innovators*
3.1.2 *Non-technological innovators*
3.1.3 *Resource efficiency innovators*
3.2 ***Economic effects***
3.2.1 *Employment in medium-high & high-tech manufacturing*
3.2.2 *Employment in knowledge-intensive services*
3.2.3 *Exports of medium and high-tech products*
3.2.4 *Knowledge-intensive services exports*
3.2.5 *New-to-market sales*
3.2.6 *New-to-firm sales.*

As one can see there is quite a definitive list on indicators. Although, listed 29 indicators of the Innovation Scoreboard can't capture all aspects or dimensions of the complicated phenomenon. Nevertheless, the popularity of the instrument among users allows some directing conclusions after the presented overview. In general, according to expert estimation Estonian development during seven years being present at the scoreboard has been quite positive (Heinlo, 2009).

According to the Community Innovation Survey (CIS) 2006 innovators (56% in manufacturing and 39% in services) are economically more successful than non-innovators. An enterprise was innovative if during last three years it had introduced to market a new or significantly improved product, implemented a new or significantly improved process, or had expenditure on activities specifically undertaken to develop and/ or implement a product or process innovation. By comparison, it should be emphasised that in 2004 the level of innovativeness of industrial enterprises exceeded 55% only in five European Union Member States, and was lower than that in Sweden and Finland. The innovativeness in the Estonian enterprises is generally influenced by the same factors as in the EU. Likelihood that the local company is innovative depends on belonging to a major concern, share of foreign equity, number of employees. Companies with foreign equity were about 1,5 times more innovative than those companies based on domestic equity (Heinlo, 2008).

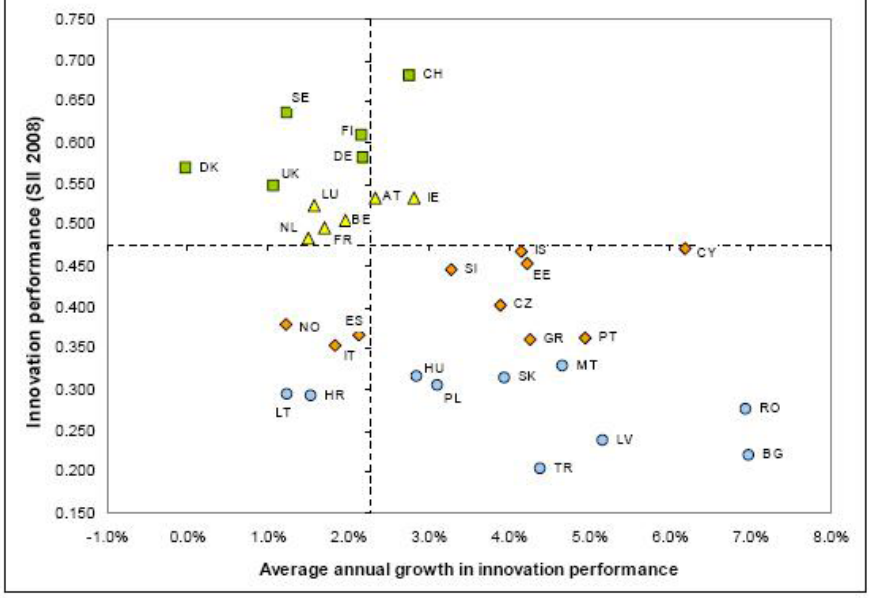
The high share of tertiary educated persons and increasing level of the innovativeness of enterprises are clear advantages for Estonia. During the period of fast economic growth (up to 2008) the following aspects should be considered advantageous: significant share of innovative enterprises in respect of technological innovation as well as of non-technological innovation, an relatively high level of innovation expenditure compared with turnover, a growing number of enterprises involved in innovation co-operation, and finally the share of new products in turnover which equals to the EU mean.

However, there are still some severe problems with low intensity of co-operation between Estonian enterprises and universities and other R&D institutions. There exists a certain challenge for the national R&D sector to take into consideration the domestic enterprises' needs.

In comparison with other member states the shortcomings for Estonia have remained the same: the shortage of patents, shortage of doctoral graduates and participants in lifelong learning per inhabitant, besides Estonian employment in the medium-high and high-tech manufacturing and the knowledge intensive services is modest. In general the R&D intensity is low but the growth rate is one of fastest in the EU.

Following Diagram allows assess the trends in innovativeness and the speed of changes. Convergence of innovation performance according to EIS 2008 is presented in Figure (EIS, 2009).

FIGURE CONVERGENCE IN INNOVATION PERFORMANCE



Colour coding matches the groups of countries identified in Section 3.1: green are the innovation leaders, yellow are the innovation followers, orange are the moderate innovators, blue are the catching-up countries. Average annual growth rates as calculated over a five-year period. The dotted lines show EU performance and growth.

European Innovation Scoreboard 2008 – Country abbreviations

AT	Austria	IT	Italy
BE	Belgium	JP	Japan
BG	Bulgaria	LT	Lithuania
CH	Switzerland	LU	Luxembourg
CY	Cyprus	LV	Latvia
CZ	Czech Republic	MT	Malta
DE	Germany	NL	Netherlands
DK	Denmark	NO	Norway
EE	Estonia	PL	Poland
ES	Spain	PT	Portugal
EU27	EU27	RO	Romania
FI	Finland	SE	Sweden
FR	France	SI	Slovenia
GR	Greece	SK	Slovakia
HR	Croatia	TR	Turkey
HU	Hungary	UK	United Kingdom
IE	Ireland	US	United States
IS	Iceland		

Fig. 1. Convergence of innovation performance in 2008 (EIS- 2008)

It is clearly evident that during the economic growth period Estonia reached the EU mean level according to integrated innovation index and had relatively high growth rate. At the same time the countries are logically grouped making it possible to follow similarities. The closest neighbours to Estonia (Figure) are Slovenia and the Czech Republic. Similarity of development of these countries (EU new member states) can be observed via comparing the indicators of different other fields as well. Looking by the vertical axis at the position of the countries one can see that the states' innovativeness depends on the economic structure and standard of living in these countries — on the top one can find the wealthy industrial countries (EU "old members").

Estonian place according to European Innovation Scoreboard 2008 is among 27 EU states 12th (Kubo, 2009).

What are the main tendencies in recent developments of fields of knowledge triangle: academic research, infrastructure of higher educational institutions and innovative enterprise?

In this aspect it is important to analyze Estonian innovative rearrangements done in social sphere, in economy and in higher educational sphere to fulfil the tasks result from Lisbon strategy to increase Estonian competitiveness.

Estonian opportunity is to increase human recourses in knowledge triangle through rising knowledge-based competitiveness. We can assume that as declared by American industrial psychologists from the beginning of this century preconditions for development of knowledge based economy lay in tight and innovative connections between two knowledge management levels: level on personalities and level of companies (Boudreau, 2002). Innovative connections between mentioned two levels increase competitiveness of both: people and companies.

Concerning Estonia – there have been some critical notes. For example, leader of internationally well-known IT firm Skype Josh Silverman said recently that Estonian higher education system is not able to provide the company with highly qualified specialists. Estonia can not keep pace with other countries in the sphere of higher education (Silverman, 2009). The main problem is that young people who learn IT at Estonian universities are interested to work in ITC companies (for example Skype) before they get their university diploma, but factually, IT-company is not interested in "half-educated" specialists because they have some skills and knowledge but miss full professional background.

To advance first facet of the knowledge-triangle means increase of professional knowledge and level of skills of people in general and specialists working in companies, develop competitiveness in larger context of knowledge based economy.

We can distinguish in knowledge-triangle theoretical as well as practical aspects. Academic studies in higher professional education sphere belong to practical aspects (institutional framework of higher education sphere).

There is 68 thousand students in Estonia today and more than a half of them (54%) pay fee for their studies. In total about 37 thousand students pay for their studies and studies of about 31 thousand students are state financed. This proportion has been the same about last 5 years. A rapid increase of students who study at one's own expense in universities resulted in years 1998-2003, when a state created only for 1% of students state financed opportunities while places for study for private money increased about 2,5 times (Kirch, 2005).

Students are accepted to both flows: the basis of state-commissioned study places and the ones that are not paid from the state budget funds. Over the years, the proportion of students studying in state-commissioned study places and those available through tuition fee has significantly

changed. The fields of study of national priority and with increasing employment rates are: engineering; manufacture and processing (different industrial technologies and products); IT sciences; environmental protection (environmental and geo-technologies); life sciences (biotechnology, biomedicine).

Another side of the *knowledge triangle* concerns creating new economic mechanisms (concrete business solutions) and creating new structure of institutions (rearrangement) to carry out new comprehensive and dynamic innovation model. Institutions who are responsible for supporting Estonian innovation development are: Ministry of Economy and Communications, Ministry of Education and Research together with bigger universities. These institutions have to make serious efforts to create well functioning environment for innovative developments. Purpose of leading institutions was to create Estonian Development Fund (EDF) starting with about 500 million EEK, which idea was largely taken from development strategy of Finnish innovation foundation SITRA. This very complicated task was carried out in 2007 (Edasi. Raport Riigikogule 2007/2008).

Mission of the EDF: 1) to promote innovative future visions, 2) to analyse Estonian future opportunities, 3) to initiate positive change of investment traditions and 4) develop venture capital market.

First management project (2007) of the EDF was path-finding. Researchers of the Tartu University (leaded by Professor Urmas Varblane) prepared an analysis about state of competitiveness of Estonian economy and its future perspectives for years 2010-2020. The message of this research was very serious – maintaining today's structure of economy Estonia will not make a progress and continuing by same model the result may be small and enclosed economy (Varblane and others, 2008).

EDF creation initiated important changes: research projects of the Estonian Development Fund give meaning to Estonian economic Development. Joint brainwork and interpretation of the trends and signals coming from the external environment into the Estonian context give input for the broad-based foresight work. Development Fund's 2008 foresight projects: Industry Engines 2018, IST_IT@ 2018 and Service Economy 2018 (see Figure 2).

Fig. 2. Growth vision 2018. The Development Fund foresight framework 2008-2009

Lastly was prepared EDF document – *White Paper to Estonian Parliament* – (on 27 of April 2009). We can say that White Paper and Estonian Lisbon agenda are first of all strategies of economic reforms.

Conclusions

Lisbon strategy is a strategy of rebuilding the EU in present financial-economic crises, where as say Paul Krugman in last book "The Return of Depression Economics and the Crisis of 2008": "the world economy turned out to be a much more dangerous place than we imagined. As readers may have gathered, I believe not only that we're living in a new era of depressions, but also that John Maynard Keynes – the economist who made sense of the Great Depression – is now more relevant than ever… Depression economics, however, is the study of situations where there is a free lunch, if we can only figure out how to get our hands on it, because there are unemployed resources that could be put to work. The true scarcity in Keynes' world – and ours – was therefore not of resources, or even of virtue, but of understanding." (Krugman, 2009).

The Estonian economy is at a crossroads – could Lisbon Strategy help us towards new growth? The answer is complicated but there is still some hope! Counting pluses and minuses we can conclude:

- First: There is high proportion of people with tertiary education in society (33% in Estonia in 2007).
- Second – relatively big share of collaborating innovative SMEs.
- The Estonian growth vision 2018 puts together the Estonian Development Fund's leadership in conjuction with decision makers now and in the future, throughout 2009.
- Estonian place among 27 EU states is 12 according to European Innovation Scoreboard 2008. And so the perspectives of the implementation of knowledge triangle based on Lisbon strategy in Estonia is optimistic.
- In the process of globalisation Europe will need new understanding of financial and economic integration concerning all EU member states. In the Baltic Sea region it means regionally distinguishable co-operation between Nordic countries and their Baltic neighbours – Estonia, Latvia and Lithuania.

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The article has been reviewed.

Received in March, 2009; accepted in April, 2009.