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The Baltic States in New Economy: FDI, Technology Flows and Innovativeness

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Summary

The aim of this paper is to evaluate the role of FDI in technology transfer and innovativeness of the Baltic States economies. The latter factors have also become main prerequisites of the Baltic States entrance into the era of “new economy”. The author exploited the data from various sources, e.g. aggregate indicators from official data, national innovation sources, international reports and own calculations based on the companies survey. The paper provides the broad analysis of the role of technology-transfer and investments into R&D in domestic and foreign owned companies based on the empirical evidence as well as the contribution of FDI to development of ITC sector in Baltic States.

The future place of the Baltic States in the “new economy” will largely depend on their innovative capacity. The paper presents the main indicators of their innovation potential and elements of national innovation systems. A short summary and some general implications towards the future FDI flows into Baltic economies conclude the paper.

1. Introduction

Significant changes in the economy, particularly related to high level of foreign direct investments flows (FDI), rising technologies and changes in productivity have become main factors of the development of new era popularly called the “new economy”¹. During the last decades, most national governments have been building favorable climate for developing international business, via FDI, foreign trade, technology flows or developing innovation policies, which became widely viewed as a prerequisite for economic and social progress. The European Council has stressed the importance of an improved capacity to capitalize on the opportunities of the “new economy” during its top meeting in Lisbon in 2000. Such efforts have also been taken by the new members of the enlarged EU.

The Baltic states starting from the early 90s have been building the liberal foundations for FDI, foreign trade and technology flows. There have been particular expectations towards the FDI, which should have resulted in the acceleration of transformation process: rebuilding the competitiveness of the manufacturing sector by enhancing technology transfer, R&D and improving the innovativeness potential of enterprises.

The structure of the paper consists of three sections. The section 1 explores the trends in FDI in Baltic states over the decade of transformation: their sectoral, branch and regional structure raises a question what role have the FDI played in the technology flows and productivity changes in the Baltic states. Section 2 provides the broad analysis of the role of technology-transfer and investments into R&D in domestic and foreign owned companies based on the empirical evidence from companies’ survey. This section has also presented the contribution of FDI to development of ICT sector in Baltic states. Finally, section 3 reviews the main indicators of the innovation potential of the Baltic states as well as the main parts of their national innovation systems. The paper ends with a short summary and implications towards the future FDI flows into Baltic economies.

¹ The term - the era of the „new economy” is here essentially used as a metaphor for the period since the mid of 1990s, and the role played by the changes in the economy related to ICT, both as new economic sector and communication means as well as other rising technologies.

2. Sector, Branch and Regional Structure of FDI in Baltic States

The Baltic states overall have received more than 3% of the total investment amount in the region of the East-Central Europe, which made some 1.4 billion of USD (Table 1).

Table 1: Inflows of FDI to the Baltic States in 1993 - 2002 in millions (USD)

Year	1993	1995	1997	1998	1999	2000	2001	2002
Baltic states	237	729	973	1799	1031	792	1407	1325
Estonia	156	199	130	575	222	183	201	364
Latvia	51	244	515	303	331	153	430	514
Lithuania	30	72	328	921	478	456	776	447

Source: The *EU foreign direct investment yearbook 2002*, Eurostat 2003; *World Investment Report 2003*, UNCTAD.

In 2003, the inward FDI stock in Estonia was 70 percent of GDP, twice as high as in Latvia (37.4 percent) and Lithuania (34.5 percent) (Table 2). In all three Baltic countries, the stock of FDI (in percent of GDP) is above the world average.

Table 2: Inward FDI stock in % of GDP in 1992-2003

Year	1992	1994	1996	1998	1999	2000	2001	2002	2003
Estonia	21.0	27.0	27.8	29.4	25.4	51.5	57.2	65.9	69.0
Lithuania	23.0	23.1	23.0	24.3	22.5	20.9	22.2	31.4	34.5
Latvia	11.2	14.9	18.1	20.1	25.0	29.1	30.4	32.4	37.4

Source: *Economist Intelligence Unit 2001*; U. Varblane, *Foreign direct investments in the Estonian economy*, Tartu 2001, p.59.

More than half of FDI stocks in Baltic states came from the EU. In 2003 Estonia has attracted the highest share of direct investments from the EU - 83,44 percent, in comparison to Latvia - 50.9 percent and Lithuania - 56.2 percent. Moreover, the biggest part of FDI stems from Scandinavian and Nordic countries (Sweden, Finland, Denmark).

The sector distribution of FDI reflects the structure of the Baltic economies. As Table 3 shows, service sectors – such as transport, telecommunications, business services, and finance – have attracted the bulk of FDI in the last years of 1995-2003, whereas in 1993-1995 most of

FDI went to manufacturing sector (on average in Estonia – 23 percent, Latvia – 20 percent, Lithuania – 26 percent). The latter was related to privatization processes and openness towards the foreign investors². Most of the manufacturing FDI is in low-tech sectors of wood processing (including paper and furniture), textiles and food. These three industries received almost 40 percent of the manufacturing FDI in Estonia, 55 percent in Lithuania and 47 percent (2002). While the food industry mainly targets the local markets, exports of the wood processing industries are substantial (particularly for Latvia).

Table 3: Structure of Manufacturing FDI in Baltic states in 1996 and 2002 in %

Manufacturing branch	Estonia		Lithuania		Latvia	
	1996	2002	1996	2002	1996	2002
Food, beverages and tobacco	31.0	22.6	40,9	42.4	50.9	29.9
Textile and textile	10.1	13.8	9.0	12.2	12.0	11.9
Leather	0.6	-	1.4	3.5	0.1	0.04
Wood and wood without furniture	0.5	-	0.1	0.1	12.0	17.6
Pulp, paper, publishing and printing	6.0	16.5	4.1	4.8	0.4	0.5
Coke, refined petroleum & nuclear fuel	5.5	-	4.4	4.1	2.0	1.5
Chemicals and man-made fibers	17.6	9.7	14.3	3.4	0.4	0.3
Rubber and plastic	3.0	1.1	1.1	3.9	0.9	1.0
Basic metals and fabricated metals	16.8	-	5,3	6.9	1.8	2.5
Electrical and computer equipment	4.2	3.3	1.2	1.3	1.0	1.8
Optical equipment	5.7	6.2	0.8	0.9	0.3	0.6
Transport, machinery and equipment	4.0	6.9	0.5	5.5	0.1	4.4
Manufacturing (including furniture)	7.2	4.0	1.0	1.3	-	-

Source: *Estonian Statistics 1999, Tallin 1999; WIIW, Nr.286 (2002);*

² P.Linge, *Pasaulio Pramonės Apžvalga*, Litimo, Vilnius 2000.

The chemical industry comes second due to one oil refinery that refines Russian oil for export (in particular in Lithuania and Estonia). Textiles and clothing FDI represent about 10 percent of manufacturing FDI in all three countries. New greenfield investments in this sector are export oriented, especially in Lithuania and Estonia.

Higher value added sectors of machinery, optical, electronics and transport equipment have a combined manufacturing FDI share of more than 14 percent in Estonia but only 7- 8 percent in Lithuania and Latvia. Some of the foreign subsidiaries in high-value-added manufacturing have become increasingly export oriented, like the Finish electronic equipment producers in Estonia. The other two countries are still lacking the export oriented investors in high and medium-high tech industries.

3. Role of Technology-transfer and Investments into R&D in Domestic and Foreign Owned Companies: Empirical Evidence from Companies' Survey

Foreign investors are rather passive in performing R&D in the Baltic states; they often do sub-contracting for foreign enterprises and use the parent companies know-how.

Empirical evidence however based on the country studies suggests that FDI has some positive impact on economic growth, restructuring and competitiveness both: directly through transfer of capital and knowledge to foreign-owned companies and indirectly through spillovers to the domestic sector³. The data showing the share of foreign-owned companies in output, exports and employment are not available from statistical offices (with exception to Estonia). According to the survey conducted by the author on small sample of 108 firms acting in Baltic states (2003/2004), in Estonia there were 24 firms (foreign-owned companies made 33 percent and domestic 67 percent), in Lithuania 50 firms (foreign-owned made 54 percent and domestic ones 46 percent) and in Latvia 34 firms (foreign owned made 44 percent and domestic ones 56 percent). Some 54 percent Estonian foreign-owned (telecommunication and electrical equipment), 38 percent of Lithuanian foreign-owned (food, tobacco and electrical equipment) and 38 percent of Latvian foreign-owned firms (electrical and telecommunication equipment) have exported their goods to the EU market. Some 81 percent of Estonian, 100 percent of Lithuanian and 84 percent of Latvian companies have significantly improved quality of their products. These changes have been observed in most of the foreign-owned companies (63 percent of Estonian, 52 percent of Lithuanian, 80 percent of

Latvian). Some 56 percent of Estonian, 78 percent of Lithuanian and 79 percent of Latvian foreign owned companies received technological know-how from the mother companies.

Survey shows that FDI has also strengthened the host countries` export potential by increasing the companies investments into R&D. The activity related to R&D conducted 68 percent of the foreign-owned and 63 percent of domestic Estonian companies, 69 percent of the foreign-owned and 77 percent of domestic Lithuanian companies and 89 percent foreign-owned and 73 percent domestic Latvian companies. Survey showed that in all three countries the foreign-owned companies aimed to meet the local consumers needs whereas in the domestic companies R&D activities aimed at new management and production solutions. Moreover, the R&D activity in the foreign-owned companies was concentrated mainly in the smallest (up to 50 employees) and the largest firms (more than 500 employees) (with the exception of Latvia). These companies have spent on average 4-5 percent and 3-4 percent of their total turnovers, whereas domestic companies only 1-3 percent.

Another survey based on a larger sample of the Estonian companies (1999) proves that foreign-owned companies (over 50 percent of foreign capital) of low- and high-tech industries achieve 40-50 percent better productivity and export per employee. Such data however is not available for the other two countries – Latvia and Lithuania.

Contribution of Foreign Direct Investments (FDI) to Development of ICT Sector in Baltic States

The innovation process is largely dependent on the information and communication technologies (ICT). Though, the ICT enables the new innovations, both in manufacturing and services, to be embedded in existing products or developed in new ones.

Service sector of the ICT– have attracted the bulk of FDI to the Baltic economies in the last years of 1995-2003, whereas in 1993-1995 most of FDI went to ICT manufacturing sector. The latter was related to privatization processes and openness towards the foreign investors⁴.

The IT sector including the telecommunication, electrical and computer equipment amounted to 13-15% of the total FDI stocks all the three Baltic economies in 2002.

Empirical evidence from broad-based country studies suggests that FDI has some positive impact on economic growth, restructuring and competitiveness – directly via transfer of

³ G.Hunya, *FDI in Small Countries: the Baltic States*, WIIW Research Reports/307, Vienna 2004, p.109.

⁴ P.Linge, *Pasaulio Pramonės Apžvalga*, Litimo, Vilnius 2000.

capital, technology and knowledge to foreign-owned companies and indirectly through spillovers to the domestic sector⁵. The technology transferred through FDI into local units has significantly contributed to development of the Baltic states IT sector.

The total number of the IT sector companies in Estonia ranges from 140-160, in Lithuania from 190-200 and in Latvia somewhere above 220. The foreign-owned companies make some 1/3 of all the companies. Most of the companies in this sector are small and medium sized companies (15-30 employees). Some of those companies specializing in creating the tools for modeling the graphical solutions, business and technological processes as well as advanced soft-engineering, CASE tools and Internet solutions (B2B) for bigger international corporations (for example „Siemens” in Lithuania, “Nokia” in Estonia). Most of Baltic companies specialize in the programming services, banking solutions and management systems. These companies have also attracted the attention from foreign investors. The data in Table 4 represents the economic performance of the biggest IT companies with the FDI.

Table 4: The biggest IT sector companies with FDI in Lithuania and Poland (2002)

	Income from production	Annual growth	Total services	Total income	Annual growth
Microlink	19.584	23%	32%	61.200	4%
Exigen	8.784	8%	99%	14.918	38%
Alna	7.340	18%	32%	22.675	46%
Dati	14.918	38%	100%	14.918	38%
IT Alise	5.359	32%	78%	6.880	46%

Source: own calculation based on *Prime Investment*, May 2003.

Some of the smaller foreign subsidiaries in the IT sector include German electronic and telecommunication equipment producers “Siemens”, American “Motorola” in Lithuania or Swedish “Ericsson” and Finish “Nokia” in Latvia and Lithuania. However, Lithuania and Latvia are still lagging behind in attracting the foreign investors into further development of the ICT sector (comparing to Estonia). However, some good news that The Lithuanian based “Microlink” has established a “competence centre” in Lithuania, specializing in system integration and retail service. Microlink competence center serves the Baltic countries and Russia. “Ericsson” serves the Lithuanian telecom market, providing sales, installation and

⁵ G.Hunya, *FDI in Small Countries: the Baltic States*, WIIW Research Reports/307, Vienna 2004, p.109.

maintenance operations for all types of equipment, including sophisticated telecom solutions. “Siemens” has established its “competence center” in Lithuania for microwave data transmission serving Baltic countries and Finland. The main manufacturing export markets of the Latvian company „IT Alise” and Estonian „Dati” were Finland, Sweden, Norwegian, Germany, Russia and the United States (2002).

4. The Innovation Potential of the Baltic States

The FDI development in the environment of “new economy” will depend on the existence of strong technological infrastructure and innovative capacity of the countries. Some principle indicators for the knowledge-based economies collected by the OECD (1996)⁶ were: 1) expenditures on R&D, 2) employment of engineers and technical personnel, 3) patents and 4) international balances of payments in technology.

Expenditure of the three Baltic countries on R&D is still below the EU level (old 15 members). In Estonia (0.9% in 2002) expenditures R&D per capita are higher than in Lithuania (0.7% in 2002) and Latvia (0.5% in 2002)⁷. Latvia and Lithuania are also below the more advanced Central East European (CEE) countries like Hungary, Czech Republic, Slovenia and Poland.

Similarly, the productivity of the R&D systems in terms of the patent applications is rather low when compared to EU old members. Estonia is performing again a bit better than Latvia and Lithuania. The US patenting is very marginal and reflects the low international relevance of the innovations.

When trying to explain the reasons for this low patenting one should notice that the relative number of researchers in Baltic states is not so low – 0.98% in Estonia, 0.81% in Lithuania and 0.69% in Latvia, while in the EU 15, it was 1.38% (2001). However the research staff in Baltic states is specialized in basic science, when it should be rather in applied research and development.

Diffusion and absorption of new technologies crucially depends on the presence of skilled workforce. According to Eurostat data (2002) the percentage of firms that had undertaken training since 1999 was in Estonia 63%, in Lithuania 43% and Latvia 53% (comparing to the EU 15 level of 62%). The positive trends have been observed in the percentage of employees

⁶ OECD, *The Knowledge Based Economy*, Paris OECD/GD/(96)102, p.46.

⁷ www.europa.eu.int/strind/innore

that had undergone some training paid or provided by the employer. In Estonia this numbers were above the EU 15 level (26%) – 34%, in Lithuania 24% and Latvia 26% (2001).

One of the significant facts for the country's innovativeness is the public and private expenditures on the education. It is important to note that the expenditure on education as a % of GDP has not been reduced during the transition. Public expenditures on R&D in Estonia were 79% of GDP, similarly in Lithuania 79% and Latvia 43%, where the business expenditures were much lower and amounted to 28% in Estonia, 16% in Lithuania and 20% in Latvia (2002)⁸.

Estonia (41%) and Lithuania (43%) have the highest share of economically active population with the third level of education among the CEE countries.

As indicated in the Table 5 Baltic states lag behind the EU 15 in all indicators except SME's innovation cooperation, population with third level of education.

Table 5: Selected Innovation Indicators for the Baltic States in 2002 in %

Indicator	EU	CEE	Estonia	Lithuania	Latvia
EPO patents/pop	100	4.6	5	1	2
USOPTO high-tech patents/pop	100	3.9	-	4	-
SMSs innovating in house	100	54.8	75	116	-
SMSs innovating cooperation	100	107.0	116	107	-
Innovation expenditure	100	94	65	-	-
High-tech venture capital/GDP	100	113	-	372	258
ICT expenditures/GDP	100	76.7	120	74	99

Source: *European Innovation Scoreboard 2002*. Technical Paper No.2, Candidate Countries, DG Enterprises.

⁸ *European Innovation Scoreboard 2002*. Technical Paper No.2, Candidate Countries, DG Enterprises.

All three Baltic countries are also lagging behind in the employment in high-tech manufacturing and services. Estonia is the best country among the Baltic states and other CEE countries concerning national innovation capacity. However like most of the CEE countries it is lagging behind in terms of productivity and low share of high-tech employment. So, Radosevic⁹ (2002) concludes that the strengths of the Estonian national innovation capacity cannot be a sufficient basis to catch up with the EU 15 level.

Innovation policy plays an important role in catching up strategy of Baltic States. The beginning of transition brought deep changes in the R&D policies. In Estonia and Latvia the industrial branch institutes were to large extent closed down. On contrary in Lithuania the block funding of industrial R&D institutes has been maintained and some of them have been transformed into state institutes and have been financed through state contracts¹⁰.

The present guidelines for technology and innovation support are set in three governmental documents: The Estonian Innovation Programme (1998), The National Development Plan (2000-2002) and R&D Strategy “Knowledge Based Estonia 2002-2006”. The aim of the latter one is to encourage the R&D development and cooperation in application of research results in enterprises. The strategies above preview also the increase in the gross R&D expenditures, fostering business R&D investments, development national innovation system.

Equally, significant steps have been taken to reinforce the national innovation support in Lithuania. Since 1996 there has been a Lithuanian Innovation Centre operating, which mission is to support and promote commercialization of scientific and technological achievements and offer assistance in technology transfer. Other institutional bodies supporting the national innovation system is Lithuanian Development Agency for Small and Medium Sized Enterprises (creating the favorable conditions for the development of SMS innovation capacity) and Lithuanian Development Agency (developing project attracting foreign investors). The governments policies for future support of technology and innovation are set out in “Programme for Innovations in Business”, which to enhance the international competitiveness of Lithuanian business by intensifying the application of new scientific achievements and technological innovations¹¹.

⁹ Radosevic S., *Innovation capacities of Estonia within the enlarged EU. Innovation in Estonian enterprises in 1998-2000*, seminar material. December 5, 2002, Tallin. www.mkm.ee/dokumendid

¹⁰ Martinson, H., Dazyte I and Kristapsons J., *Transformation of R&D systems in Baltic States*, in: “Transforming Science and Technology Systems – the Endless Transition?”, IOS Press, Amsterdam, p. 108-117.

¹¹ OECD, *Forum for Enterprise Development. Baltic Regional Programme, Lithuania Country Assessment*, Paris 2001, p. 35.

The following innovation support providers exist in Latvia: Latvian Electronic Industry Business Innovation Centre established in 1993 (provides information on new technologies and fundraising), Baltic Association of Science/Technology Parks and Innovation Centers established in Riga in 1996. The Latvian government has pointed out at following sectors where Latvia is gaining some competitive advantages in the region: information technologies, pharmaceutical industry, bio-technology and timber chemistry. The government has been in particular supporting the creation of industrial clusters in these branches.

It is important to mention that in recent years Baltic states have joint their efforts in developing their innovative capacity mainly by building common technology clusters. Among the most successful ones was pan-Baltic IT cluster, *Baltic Information Systems Cluster*, *Baltic IT&T Forum* or *Baltic Technology Group*¹².

5. Concluding Remarks and Policy Implications

This paper tried to give a tentative overview of the role of FDI, technology transfer in building the innovation capacities of the Baltic states. On the basis of the article analysis some main findings were as follows:

1. As main features of FDI in the Baltic states it's important to highlight the shift in FDI sector structure: in 1992-1995 major part of FDI went to manufacturing sector, while in the last years 1995-2003 most of FDI has been directed to services. Manufacturing FDI went mainly into low-tech industries. FDI has reinforced the given economic structure and has not generated much structural change. Latvia and Lithuania with its export-oriented FDI in textiles, wood products and petroleum-refined products are more similar to other less developed transition countries. Estonia has succeeded more than other two countries in attracting the transnational corporation specializing in high-tech products (electrical and communication equipment), while Latvia and Lithuania still use their advantage as low-cost countries to attract international subsidiaries in low- and medium-high tech industries.

2. The extent of the FDI impact on the country innovativeness depends largely on the other policies assisting and enhancing the FDI inflows as well as the technological learning and *spill-over* effects on the national companies. Foreign investors were rather passive in performing R&D in the Baltic states; they often do sub-contracting for foreign enterprises and use the parent companies' know-how. However, some positive trends have been observed in

¹² M.Nissinen, *Informational Technology*..op.cit

the results of the empirical survey in domestic and foreign-owned companies. In the long run, the expenditure made by enterprises on technological development and R&D must increase.

3. The public investments into R&D (gross expenditures) as well as the share of industry in total spending have been quite low. Another problem results from the low patenting. The absorptive capacity of Baltic states seems to be rather good, when it concerns various indicators of human capital, education and training. The innovation capacity of the Baltic economies is also supported by the high expenditure on the ITC in particularly from the foreign owned enterprises (especially in Estonia).

4. The major determinant of the FDI development in the era of the “new economy” is the existence of strong technological infrastructure, such as science and technology parks, innovation and incubatory centers as well as qualified labor resource. It is expected that these factors will become the most important ones to insure the further FDI flows to the Baltic states economies. At the same time the geographical location of the Baltic states - at the borderland of the enlarged EU with Russia - may become an additional factor of international FDI inflows to Baltic states. Finally, the Baltic states innovativeness will depend on their long-term innovation strategies, which shall assure the further catching-up processes and reinforce their international competitiveness.

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