



CEIRD

Centre for Entrepreneurship,
Innovation and Regional Development

DISCUSSION PAPERS

**PROACTIVE BEHAVIOUR OF
ENTERPRISES IN CHANGING THEIR
INSTITUTIONAL ENVIRONMENT AND
EXTERNAL RESOURCE BASE**

**Under the Pressure of International
Technological Competition**

Anna Pobol



CEIRD

Discussion paper No 3



Centre for Entrepreneurship, Innovation and Regional Development

at Ventspils University College

Discussion Paper No 3

**PROACTIVE BEHAVIOR OF ENTERPRISES
IN CHANGING THEIR INSTITUTIONAL
ENVIRONMENT AND EXTERNAL
RESOURCE BASE**

**Under the Pressure of International Technological
Competition**

By Anna Pabol¹

2013

¹ CEIRD at Ventspils University College (Latvia), Assoc.Prof. at Belarusian State University (Belarus). E-mail: anna.pabol@tut.by



CEIRD

Discussion paper No 3

**Centre for Entrepreneurship, Innovation and Regional Development
at Ventspils University College
is supported by:**



ISBN 978-9984-648-41-5

© Author, Centre for Entrepreneurship, Innovation and Regional Development at
Ventspils University College



Table of Contents

Abstract	6
1. Theoretical framework and methodology	7
2. Belarusian IT cluster as a part of international IT market	8
2.1. Main characteristics of Belarusian IT industry	8
2.2. Competitive advantages and problems of development of Belarusian IT cluster.....	9
3. Proactive behavior of enterprises under the pressure of international technological competition.....	11
3.1. IT companies' impact on resource base.....	11
3.2. IT companies' impact on institutional base	13
Conclusion	15

**Abstract**

National innovation systems (NIS) of the countries with transformation economies are often accused of underperformance due to existing institutional gaps and shortage of resources. Basing on the empirical evidence of IT companies in Belarus we will study how the most active enterprises in the region pressured by international technological competition can impact the external environment in order to fill the institutional gaps and increase the pool of available resources. The paper provides the empirical evidence in support of idea of the NIS self-tuning and institutional entrepreneurship, and will contribute to understanding of the factors and forces behind such phenomena.

Key words: national innovation systems, IT, international competition.



Abstract

National innovation systems (NIS) of the countries with transformation economies are often accused of underperformance due to existing institutional gaps and shortage of resources. Basing on the empirical evidence of IT companies in Belarus we will study how the most active enterprises in the region pressured by international technological competition can impact the external environment in order to fill the institutional gaps and increase the pool of available resources. The paper provides the empirical evidence in support of idea of the NIS self-tuning and institutional entrepreneurship, and will contribute to understanding of the factors and forces behind such phenomena.

Key words: national innovation systems, IT, international competition.

1. Theoretical framework and methodology

National innovation systems (NIS) of the countries with transformation economies are often accused of underperformance due to existing institutional gaps and shortage of resources.

The NIS theory has deeply integrated the rationale of the institutional theory by describing the structure of each national innovation system through the prism of nation-specific institutions for knowledge generation, diffusion, exchange and employment (Lundvall 2002, Carlsson 2002, Nelson 2002). One of the core statements is that at a country-level these institutions may have some national peculiarities that do not prevent these institutions from fulfilling their knowledge-related functions. Thus, each NIS is different and there can be no “ideal” pattern for a NIS because the routines that were elaborated in some countries during their historical path of development can be completely neglected by individuals in other countries with their cultural traditions.

Besides that, however, NIS-scholars also argue, that national innovation systems can perform below their potential output (of learning, knowledge, innovation etc.) because of so called in-efficiencies and inefficacies, when innovation-related actors and institutions fail to fulfill their innovation-related functions (Niosi 2002). The frequency of institutions’ malfunctioning observed in real life has become justification for the state intervention into the innovation sphere in form of national innovation policy that aims at elimination of these failures and creation of favorable conditions for innovation processes in the country.

In the new institutional theory the institutes are acknowledged to get formed either by natural way (as a result of stochastic process of unintentional interactions of agents, when the accumulated changes in the social life cause the need to eliminate the contradictions, and the interactions that are organized according to some more efficient patterns gradually substitute the less efficient interaction modes (Schotter 1981, North 1990), or by an artificial way (when they are borrowed from other countries and “transplanted” into the economy, or when they are “projected” by the governmental authorities that seek to regulate the economic relations and lower the uncertainty in the economic system) (Schastitko 1997). The role of actors is thus reduced to individual trial of new modes of



interaction with other agents, unless they are employees of governmental bodies and the elaboration of new rules is their job.

Our paper will provide the empirical evidence in support of the idea of the NIS self-tuning via the proactive behavior of the actors interested in institutional change, and will seek to contribute to understanding of the factors and forces behind such processes.

Our methodology will lean on theoretical foundations of the NIS-concept, systems theory, and new institutional theory, complemented by qualitative field research (participant observation, in-depth interviews with experts, cases studies and factual data analysis) during the 2010-2011 research project of Association of IT developers “Infopark” headed by the author and updated desk data analysis.

2. Belarusian IT cluster as a part of international IT market

2.1. Main characteristics of Belarusian IT industry

Historically, Minsk was among the main USSR IT centers because of the computer production facilities and design institutes that were concentrated here. In Soviet times, Belarus covered roughly 60% of the USSR’s demand for IT (computer production) (IBA, 2013). Today, the IT sector benefits a special treatment from the government. In 2005, the Belarusian High-Tech Park (HTP) was established in Minsk with the main goal to support software industry. HTP Belarus provides special business environment for IT business with incentives claimed to be “unprecedented for European countries”: the residents of HTP pay no corporate income tax and their employees enjoy the lowest personal taxes in the eastern European region. Any company operating in the sphere of computer-based technologies can apply for residency within the HTP independently from its territorial location in the country.

Nowadays, IT sector in Belarus is considered to be the largest IT cluster in the Central and Eastern Europe (CEEEOA 2010). Due to the limited domestic demand especially from industrial enterprises, it is rather well integrated into the world market, delivering



outsourcing services to major IT vendors of the world (like HP, IBM, Microsoft, Oracle, SAP, 1C), but also possessing a developed network of constant smaller foreign partners.

The estimated number of software developers, web designers, network administrators, and other technical personnel working in the IT sector of Belarus is over 25,000 (Mamonenko 2010). Approximately 650 companies and organizations operate on the ICT market of Belarus. Currently 125 companies are registered as the residents of HTP (HTP 2013).

Because of the small domestic market for IT products (it is mainly represented by state institutions, financial enterprises, banks, and corporate customers, with a rather little share of industrial enterprises), Belarusian companies mainly target at Western customers' orders. The niche on the world IT market of Belarusian companies can be described as an offshore IT service provider (software development, outsourcing) for clients who expect the involvement of highly skilled technology resources under low costs.

A typical Belarusian IT service provider is a small team of less than 100 employees. However, there are large-scale enterprises that employ several hundred people, such as IBA Group (more than 2,500 employees), EPAM Systems, and SaM-Solutions. HTP database refers to 26 companies with the staff number from 101 to 1000 person and 3 companies with the staff over 1000 person.

2.2. Competitive advantages and problems of development of Belarusian IT cluster

Belarusian IT sector has found its niche among the other IT clusters in the world and is famous for its academic background. Its competitive advantage consists of:

- *availability of skilled IT staff* due to productive education system (3,900 IT-related specialists graduate from Belarusian universities annually) that provides the ability of IT companies to implement large-scale and long-term projects;
- *technical excellence, flexible thinking and creativity of staff* (Belarusian developers are claimed to possess deep knowledge in mathematics, engineering, physics, and other sciences) that results in the ability to solve complex problems and develop high quality applications;



- *relatively low costs of services* (about 7 times lower than that of USA staff (Forrest 2012));
- *low employee turnover*;
- accessible location and geographical proximity to Western Europe countries; low operating costs, cultural compatibility with Western Europe countries;
- favorable regulatory environment for IT business.

The main problem of Belarusian IT companies is the *severe shortage of qualified specialists in IT sphere within the NIS*, compared to the growing foreign demand. In fact, every working day there are 10 new jobs created in the HTP – thus an annual demand increment in HTP alone, where 20% of Belarusian IT companies work, makes about 3600 workplaces, while the universities supply to the whole economy about 3,900 IT-related specialists annually. This problem also has a qualitative side: the *gap between the knowledge given by the existing system of high education to IT graduates, and the needs of IT businesses*.

Because exactly the qualitative characteristics of the regional staff make the competitive advantage of Belarusian IT companies in the world market, the companies have no other way than to seek for improvement of the situation with resources.

The largest enterprises have started to solve this problem for themselves by regional diversification and sourcing graduates outside the capital city. The other solution was the decision of IT companies to establish the educational centers for re-qualification of the personnel and a number of additional instruments to further improve the human resource pool.



3. Proactive behavior of enterprises under the pressure of international technological competition

3.1. IT companies' impact on resource base

To cover the gap between supply and demand in the labor market in the field of ICT, new forms of cooperation between IT enterprises, universities and research institutions begin to develop. These relationships gradually become institutionalized and acquire the sustained, regular and organized character.

Linkages of the academic sector and IT companies in the educational process include the following basic forms of interaction:

- the establishment of joint training labs;
- participation of enterprises in the correction of the nomenclature of specialties and curriculum content;
- organization of students' practice in enterprises, training of trainers in enterprises;
- delegation of employees of enterprises to universities as teachers;
- financing by companies of training activities of universities, and other forms of linkages.

The main purpose of this interaction is proactive involvement of IT enterprises in the training of IT professionals who will not require retraining after employment.

In order to create a long-term foundation to saturate their growing demand for IT personnel, IT companies *encourage the interest in education and work in the field of IT of the pupils of primary schools and organize specialized IT competitions and Olympiads for them.*

Addressing the problem of the gap between the standard training programs in universities, and the need of IT companies for IT staff that would be able to use the modern information technologies immediately after their employment, IT companies *begin to integrate into the learning process of students at an early stage.* They organize internships for students and professional development for teachers in enterprises, finance the training



activities of universities, seek for possibilities of updating the range of IT-related specialties and curriculum content at the universities.

Top-rated practitioners of IT companies hold *open seminars and workshops* for students of high schools on topics that are not included in the standard learning process, but that are important for the IT industry (i.e. in a framework of International Forum IST.EDU '2010 "Vocational Education and Research in Information Systems and Technologies") (Infopark 2010).

The establishment by IT companies of **joint training labs** enables students' learning on software development on modern platforms (eg, Java, Perl, PHP, C #, Lotus Notes, 1C, etc.), allows post-graduate students to learn modern standards of software development and get prepared for certification exams (for example, of *Sun*), and creates the basis for long-term sustainable growth of the quality of training of IT professionals through professional development of teachers and development of advanced training courses. Establishment of joint training labs is a multi-purpose tool: it can provide the possibility for joint scientific research, or serve as a platform for parallel development of complementing skills (like basic IT plus foreign language and knowledge of foreign market), or even become a space for incubating students' start-ups.

Companies do not only seek for the larger number of IT staff: understanding that their competitive advantage lays in the technical level of staff, they invest into *support of scientific research profile of field-oriented departments*.

The *main problem of the functioning of educational laboratories* and the introduction of new courses in universities is the lack of training of teachers because of high migration of them from education sector in the IT business. The *delegation by IT companies of lecturers to universities* from the employees of enterprises did not become a standard practice, because it is difficult to distract specialists from the projects. In addition, the difference in the level of wages of specialists sent from IT companies to universities and lecturers, for whom university is the principal place of employment, causes problems of integration of companies' lecturers in the university lecturers' community.



In view of this, the **number of companies launch their own training courses:**

CJSC "BelHard Group" is preparing certified specialists in the areas of project management in IT, IT Business Intelligence, software analysis and quality management, software analysis and test management under the certification program of the QAI Global Institute, USA. Because the processes of software development and implementation have their own specifics, *BelHard* offers additional training in specialties "Business analysis in software development", "Project Management in IT," "Financial management of IT projects," "Risk management in the development and implementation of information systems " (Belhard 2013).

Also, *specialized educational institutions and departments are launched in Belarus*, indicating that *the system finds stable institutions to ensure the continued development of the IT sector.*

3.2. *IT companies' impact on institutional base*

Establishment of educational centers for re-qualification of the personnel and the other tools to improve the human resource pool (described above) is usually performed by the largest IT companies. Often, the companies invest their money and human resources to train the IT staff to modern technologies, but they cannot bind the students who are free to choose the employees. This is a direct production of *positive externalities* for other IT companies that specialize in innovative products with higher value added and can draw away the personnel educated by others by offering them the higher salaries.

Because the available labor legislation does not provide instruments for resolving the conflicts of interests emerging due to IT staff migration, in order to prevent the externalities to some extent, in 2005 IT companies have *elaborated a common institute* – a Declaration "*On the voluntary mutual commitments regarding the hiring of specialists*" by signing which they accept a voluntary commitment to adhere to the following standards in the relationships of hiring of IT experts. By now, 56 companies have joined the Declaration.



In order to resolve the qualitative side of the problem with IT personnel, IT organizations have initiated to supplement the existing *National Classifier of the Republic of Belarus OKRB 011-2009 "Specialisations and qualification"* with six new specializations and personnel positions that are demanded by the market. They have developed the detalisation of functions of these new professions and the necessary competencies.

Representatives of non-governmental educational centers have requested the Ministry for Education for *giving them right to start training adults* offering them supplementary education in the IT sphere. First, this request was expressed in the round table discussion, but having got an informal agreement from the Ministry of Education representative, it next is going to be repeated via the official procedure as a basis for legal framework modification.

The other problems of IT-sector development in Belarus include the lagging behind (comparing to IT supply side possibilities) legal framework in the country for usage of advanced forms of work and introduction of innovative products and services by domestic customers, and the lack of competences of domestic customers in mastering the new information systems and technologies. These problems are addressed by particular IT companies in their everyday activity of awareness creation among and training of customers, including industrial enterprises, which are the weakest segment of demand in the country.

Horizontal interaction between IT companies contribute to the development of individual sectors in the market of IT services. The most advanced subsystem of software engineering cluster in Belarus is the banking sector. Here, there is a number of IT companies that are constantly share the information, take an active part in the discussion of the problems of the sector and the necessary institutional changes to it during the conferences, workshops, seminars, and organize joint work on the development of common products. These companies have taken an active part in *shaping the legal conditions for the introduction of digital signature*, the first user of which has become the banking system. The main companies involved in developing software for the service of documents in Belarus, have cooperated with the company supervised by the National



Bank of Belarus in order to establish a common understanding of the key parameters that need to be taken into account when shaping the regulatory framework for introduction in practice of digital signature.

But also, disclose of common needs for institutional shifts of IT companies and the representation of these needs to relevant governmental authorities is undertaken by special organizations that act as mediators between business and government.

Conclusion

The paper has shown that when the sector is open to international market and competition, when the business environment is not excessively suppressive, and when the actors of the system have a framework for discussing their problems and elaborating a common viewpoint, they start modifying their environment, including their resource base and the institutional framework.

Some particular characteristics of actors allowed them to become the agents of institutional change in the surveyed sector. The most impactful on the institutional base businesses have been rather influential by their size (turnover, employment, taxes paid); develop and introduce the innovative technologies, solutions or products in the market; possess the developed horizontal and vertical cooperation linkages with other companies in IT industry (subcontracting, collaborating in the projects, outstaffing etc.).

All in all, the phenomenon of institutional entrepreneurship was confirmed to be impactful also in the transitive economies. This might be partially explained by the yet immature institutional framework.



References

- Belhard (2013). *Web developer Educational Center*. Available at: http://soft.belhard.com/educational_center.html.
- Carlsson, B. et al. (2002). "Innovation Systems : Analytical and Methodological Issues," *Research Policy*. 31(2), 233–245.
- CEEEOA (2010). *Central and Eastern Europe IT Outsourcing Review 2010*. Central and Eastern European Outsourcing Association. 165 P.
- EPAM (2013). *EPAM company news*. Available at: <http://www.epam.com/company/news-events/press-releases/2013.html>.
- Forrest, B. (2012). The Skype Killers of Belarus. *Bloomberg Businessweek: Technology*. August 13.
- HTP (2013). *Belarusian High-Tech Park*. Available at: <http://www.park.by/>.
- IBA (2013). *Belarusian IT Industry*. IBA Group. Available at: <http://www.development.by/it/>.
- Infopark (2013). *Scientific and Technological Association of IT developers*. Available at: <http://infopark.by/news>.
- Lundvall, B.-A. et. al. (2002). "National Systems of Innovation and Competence Building," *Research Policy* 31(2), 213-231.
- Mamonenko, I. (2010). *Belarus: version 2015*. Available at: <http://it-strana.by/76>.
- Nelson, R.R. and K. Nelson (2002). "Technology, Institutions, and Innovation Systems," *Research Policy*, 31(2), 265–272.
- Niosi, J. (2002). "National Systems of Innovation are X-efficient (and X-effective)," *Research Policy*, 31(2), 291–302.
- North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*, Eds. Alt, J. and D. North. Cambridge: Cambridge University Press.
- Schotter A. (1981). *The Economic Theory of Social Institutions*. N.Y.: Cambridge University Press.
- Шаститко, А. (1997). "Условия и результаты формирования институтов," *Вопросы экономики*, 3, 27-39. [Schastitko, A. (1997) "Conditions and Results of Institutes' Formation" *Questions of economics*, 3, 27-39.]



CEIRD

Discussion paper No 3

**Centre for Entrepreneurship, Innovation and Regional
Development
at Ventspils University College**

**Inzenieru street 101a
Ventspils, LV 3601
Latvia
www.venta.lv**