

Abstract on dissertation

**“FORMATION AND STATE REGULATION OF NATIONAL INNOVATION SYSTEM:
RESEARCH-BASED SPIN-OFF ENTREPRENEURSHIP”**

RELEVANCE OF RESEARCH AND GOALS-SETTING

Radical changes in economic, social and political systems after gaining the independency of Belarus in 1991 caused significant transformation in scientific and technical (S&T) sphere. Social recognition and political awareness of the role of innovation trace for transitional economy of Belarus by restructuring the technological basis of industry and overcoming the economic gap have begun to develop. Nevertheless, there is still little sequence in political decisions and also little readiness to bear the anti-electorate social costs of actual restructuring of industrial sector, and whole palette of economic relations. Private business is still out of favour of government, and financial flows are overpassing science and research.

Synergetics argues, that the lack of stability is the fruitful soil for the new stabilizing structures would be born in the open non-linear systems (CIPIN, 1996). Academic science, where the knowledge serves as input and output, is inherently such a system. One of grounds to study the transformations having taken place in the scientific sphere of transitive economies (and occurring till now) is to estimate their role as the mechanisms of self-regulation. The whole palette of failures (market, governmental, system, networking failures), technological trajectories, path-dependencies (technological and organisational), and lock-in situations is embodied in a getting formed NSIs of transitional economies (Nelson, 2002, Carlsson 2002, Niosi 2002, Lundvall 2002).

METHODS

This has called for working out the **new methodological approach** to study the very process of how the NSI gets structured and what are the natural and artificial obstacles to build a coherent sustainable NSI in a post-Soviet economy. Two main tracks are followed in process of current research: **context study** and **participative empirical research**.

Because of high diversity of systems to organize innovation activity in each country (different educational, political systems, structure of economy, geographical position, and mentality), benchmarking in building the NIS should be approached with precaution. Analyses of international practices in NSI-related policy needs hence always to take into account the **specifics of contextual framework** these practices are introduced in.

The **empirical basis** of the project, which provides the major qualitative data about undergoing transformations in NIS, are the case studies with “opportunistic data collection” (Eisenhardt, 1989) (see Box 1) of the innovative technology-based enterprises grounded by public research laboratories (Research-based Spin-off firms - RSOs). It reflects the process of functions’ and authorities’ shifts in between the actors apropos knowledge and technology transfer. Studied into are the processes of their emergence, performance and relationships to the parent institutions and industry, with the aim to find out the niche of RSOs in a National Innovation System (NIS).

The need is obvious to create a reliable *framework for verification, validation and analyses of qualitative data gained during face-to-face interviews*. I suggest, the only way for constructing the theoretical concept which would benefit from objective, many-sided evaluation of interconnections about RSOs in NIS, is to communicate with possibly different actors. In my set of opportunistic views collection are:

- the representatives of different layers of parent organizations (director of the institute, heads of laboratories, ordinary researchers, bookkeepers);
- different layers of research-based spin-offs (managers, technical managers, bookkeepers);
- organizations rendering innovation support;
- assessment of spin-offs’ success from their “sisters” and “sworn brothers”;
- spin-off-ers’ (competences, behavior mode, self-rating) as social strata in different countries;
- observation of communication process between different-nations researcher-entrepreneurs;
- process of linking them by international “bridge” organizations;
- the clients of RSOs (customers of their knowledge-intensive products and services);
- second generation spin-offs.

Box 1. Opportunistic data collection

RESULTS

One of the **claims of dissertation**, which have **resulted** from research, considers the emergence of a stratum of innovating-for market researchers to be a valuable linking chain strengthening the weak linkages "university-science-industry". However, their role is not merely restricted to this commonly accepted function of technology transfer, - I argue that it is a remarkable stage in institutional transformations required for developing of a coherent and sustainable (in both economic and social senses) NIS. The innovation competencies and culture fostered by them in an innovation system serve as the catalyst for developing of a knowledge-based economy.

“Discursive” comparative analysis of academic spin-off firms with these in European countries has been carried out in order to understand the ways how RSO contribute to transformations in the S&T sphere. Particular attention is paid to origin factors of RSOs, reasons for spinning off, (technological and oth.) relations with parent and other institutions in NSI, and competences. „Why’s“-analyses of the relationships behind the RSO functioning schemes has led to the new understandings of RSO phenomena essence. The following **hypotheses**, which open perspectives for further research, have

been the intermediate outcome of my investigations: *RSO's shaping of technological profile of NIS; sub-organising the networks in science and industry; innovation culture shifts.*

Thus, the **path of research** runs as follows:

First, theoretical and methodological background of research is studied into, with defining the terms, methodology, and profound discourse into theories and previous empirical studies. Further, financial and organizational provision of RSO activity is analysed: framework conditions of scientific and technological sphere in Belarus. From microlevel perspective the organisation of RSO activity, insight into practices and processes is done, considering the problems and barriers, as well as incentives, moving forces, and factors of success. By proceeding the analyses with relationships between the institutions and networks, it becomes possible to estimate the functions this novel for a post-Soviet economy type of innovation activity organisation plays in forming the NSI. Last, the relevant policy implications are discussed into, with special attention paid to cluster and industrial policy, entrepreneurship and education policy, network policy and institutional policy as framework-building one. Realising the complexity and dynamical character of the phenomena studied, suggestions to further research are expected to be made, based on conclusions from my research.

LIMITATIONS

The major limitation is connected with object of study, which is even not statistically accounted in Belarus (the more or less indicative classification has been introduced by BMBF (2002). Trying to *quantitatively estimate the RSO sector in Belarus*, I must admit that no exact data in Belarus is affordable. Share of small innovative enterprises (with the size being defined as “small” according to a *per industry-ranging*) appears to be very small, while official status of “innovative” strictly demands that organisation performs R&D. In general, there have been 317 enterprises (1.2% of small entrepreneurship) in Belarus in 2002, which have met the requirements of such definition (Ivanov et al, 2003). As for spin-offs from public research organizations, the only data is available about small innovative enterprises started with participation of National Academy of Sciences – which is about 30 small innovative enterprises.

	1997	1998	1999	2000	2001	2002
Number of small innovative enterprises (SIEs)	601	537	503	412	348	317
Share of small innovative enterprises in total number of small enterprises	2.8	2.2	1.9	1.6	1.4	1.2
Share of employees at SIEs in total number of employees at small enterprises	2.7	2.4	1.7	1.1	1.0	0.8

Table 1: Small innovation entrepreneurship in Belarus. Source: Ivanov et al, 2003

This way, statistical analyses would not be representative because population is only 30 enterprises. Researcher has to develop a reliable and objective **qualitative analyses methodology**.

CONCLUSIONS

Till now, no theory has been developed to research-based spin-off firms (RSO) and their particular role in national systems of innovation. The **targeted developments** in my doctoral research will be:

1) development of a coherent structure of **categorical apparatus (tool-box of categories)**, necessary to describe the variety of appropriate relationships. Especially relevant this task is for a post-Soviet science because till now there exists a large gap between categories sets (for example many categories from knowledge economy branch have not entered the common practice),

2) disclosure of deeper relationships (linkages and contradictions) around innovation process organisation in Belarus. The matter is, state interference into the processes of knowledge and technology transfer has enjoyed vast spread in these latter days, with “best practices” disseminating all over the borders. However, lack of **conceptual understanding of the processes** and of specific shapes attributed to them by (national) context of a transformation economy on a fundamental level of interconnections might obviously lead to policy decisions being prejudiced and biased.

3) **integration of various theories** in a given study for an *objective, composite, multi-layer and many sided insight into the matter*, which will add value to policy-making for both sides. For Belarus, it will be pursuing the knowledge and innovation understanding dynamics of developed economies. And for the latter, successful validation of new concepts on a transitive economy' example will be a perfect background for further advances in both concepts development and policy tuning: because in a transitive economy all the processes develop faster and more intensive, thus easy to assess.

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