



New Challenges of Economic and Business Development – 2012

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TRIPLE HELIX MODEL OF INNOVATIVE DEVELOPMENT: ROLE OF LOCAL GOVERNMENTS IN REGIONS OF LATVIA

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Abstract

Globalization is a significant force reorganizing the world's economy through new knowledge and technology. Thus, the production of innovations becomes vital for national and regional economies. In 2011 Latvia ranked 27th in the EU in terms of innovation and this gives cause for concern.

A Triple Helix (TH) model of interaction among universities (U), industry (I) and government (G) was worked out by H.Etzkowitz and L.Leydesdorff in mid 1990s. According to this model an innovation is an outcome of interaction among social coordination mechanisms: markets, knowledge production, and (public or private) governance. Three environments or functions are specified in the model: (1) wealth generation (industry), (2) novelty production (academia), and (3) public control (government).

A single indicator of economic effect of TH model has not yet been created, therefore, currently the components are investigated and measured separately and then compared to identify the linear and nonlinear interaction and patterns. To measure the U-component the principles of bibliometrics and scientometrics are applied with related metering parameters – citation analysis, number of publications, citation indices, number of patents granted, etc. To measure the I-component (understood as a technology business that focuses on the introduction of high technology products in the industry) economic indicators are used, such as the number of high-tech enterprises, the volume of output of their new products, etc. At the junction of U



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and I components the performance of high-tech enterprises and start-ups, including university spin-offs, are measured and compared with economic indicators. The G-component makes decisions on national and local levels that affect the statistics of the first two components.

The aim of the paper is to define the current status of Latvian local G-component in TH triadic structure and to find the points affecting the growth of regional competitiveness that can bring the maximum synergistic effect with minimum investment.

Being a significant force reorganizing the world's economy through new knowledge and technology, globalization is one of the most important factors of the external environment for all market participants [1]. Globalization does not mean only open markets and business opportunities but sharp competition as well. In the knowledge-based economy and information society innovations are one of the main boosters of economic development. The creation of innovations becomes vital for national and regional economies that seek for prosperity and social stability. "Latvian National Development Plan 2007-2013" prepared by Ministry of Regional Development and Local Government (MRD&LG) of the Republic of Latvia, that became the basis of EU National Strategic Reference Framework 2007-2013, declared: "...it is necessary to create favourable conditions for innovative development directed at employing internal intellectual resources (endogenous). Greater use should be made in the economy of intellectual property (inventions, technologies, products) created in Latvia...; this would increase the number of patents developed in Latvia (especially in the field of high technology), develop the science and technology commercialization structure and create closer ties between the research and scientific institutions, companies, and the ties of these institutions with the real market situation" [2]. But according to Innovation Union Scoreboard (IUS), in 2011 Latvia ranked 27th (the last) in the EU in terms of innovation, called a "modest innovator" [3] and this gives cause for concern.

Innovations require appropriate external and internal environment, institutions, financial investment, but first and foremost they need intellectual investment. The level of intellectual capital in the country is one of the major means for survival in the globalized competition. The intellectual capital of the country is created through the system of education, health care, social protection, values and beliefs, "import of brains", etc. "However, it is worth remember that in knowledge economy the main driving force is tertiary education" [4]. One of the models of innovative development that ties together tertiary education, industry and society is a Triple Helix (TH) model of interaction among three components: universities (U), industry (I) and government (G) that was worked out by Henry Etzkowitz and Loet Leydesdorff in mid 1990s.

The aim of the paper is to define the current status of Latvian local G-component in TH triadic structure and to find the points affecting the growth of regional competitiveness that can bring the maximum synergistic effect with minimum investment. For purposes of the study monographs, scientific articles, official documents, bulletins and statistical data of Latvian government, Higher Education Institutions (HEIs), Latvian local governments, Centres of Technology Transfer, and Investment and Development Agency of Latvia were reviewed and analyzed.

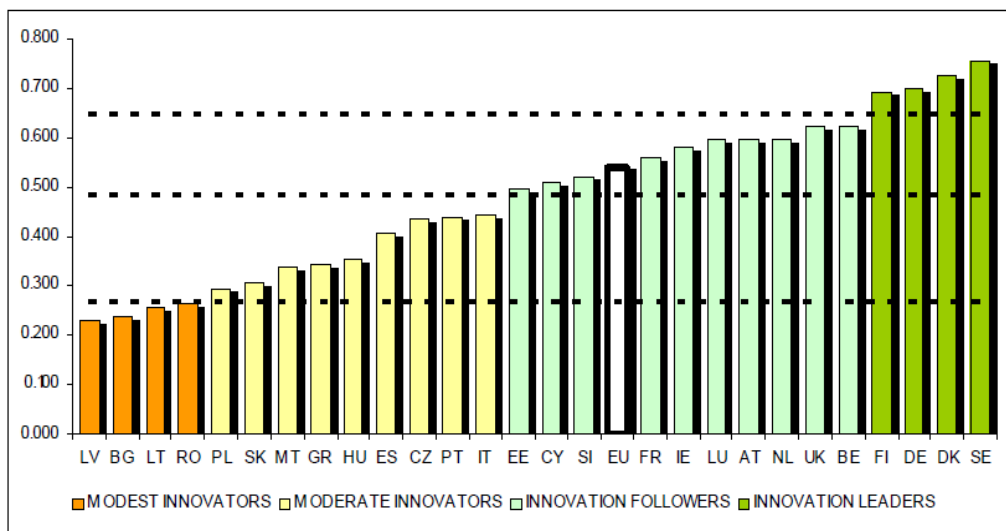
The TH model was generated from an analysis of government's relation to universities and industry in different societies and its various roles in innovation [5]. According to this model, an innovation is an outcome of interaction among social coordination mechanisms: markets, knowledge production, and (public or private) governance. Three environments or functions are specified in the model: (1) wealth generation (industry), (2) novelty production



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(academia), and (3) public control (government) [6]. The model “enables the analyst to specify the relations between private property and profit maximization, public control functions as legislation and regulation, and the innovative dynamics of the techno-sciences in empirical instances, and thus to contribute to the development of solutions to problems at interfaces among the central functions of today’s society” [7].



Note: Average performance is measured using a composite indicator building on data for 24 indicators going from a lowest possible performance of 0 to a maximum possible performance of 1. Average performance in 2011 reflects performance in 2009/2010 due to a lag in data availability.

Figure 1. EU Member States’ Innovation Performance in 2011

Source: Innovation Union Scoreboard, 2012

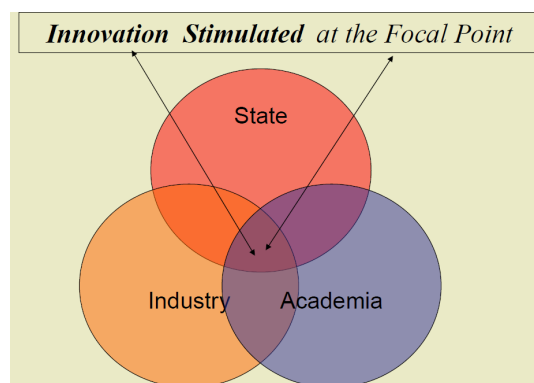


Figure 2. Classical Triple Helix model

Source: Henry Etzkowitz, 2008



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Currently, there are two main approaches in the researches carried out in the stream of the TH model: neo-institutional, supported by H. Etzkowitz (Stanford University), and neo-evolutional, supported by L. Leydesdorff (University of Amsterdam).

From neo-institutional point of view, an innovation system (both regional and national) is being operationalized through its main institutional actors: universities, industry and governments. These actors interact in trilateral relationships thus undergoing transformations, “taking the role of each other” [5] and creating innovations and innovative environment. The role of communication among them grows exceptionally.

But the path to TH begins from two opposing standpoints: a statist model in which the government is controlling universities and industry (see Figure 3) and a laissez-faire model in which the three components are separated from each other and interact modestly across strong boundaries (see Figure 4) [6].

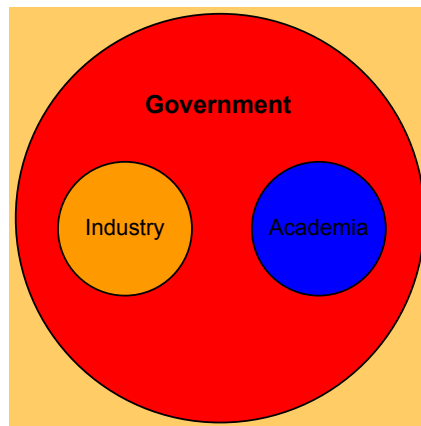


Figure 3. Statist Model

Source: Henry Etzkowitz, 2008

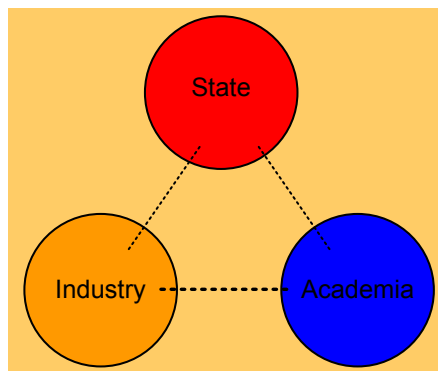


Figure 4. Laissez-Faire Model

Source: Henry Etzkowitz, 2008



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The statist model is used in many transitional economies, where the role of government is still rather high, while the *laissez-faire* model is inherent to open liberal economies. Both models have their strong and weak points. In the statist model the government has an opportunity to use its power and resources for innovation promotion but the “bottom-up” initiatives may be ignored. In the *laissez-faire* model the industry acts as a mover of economy and innovation development but if the industry is not strong enough it has no resources for innovations. At the same time, the decrease of the role of government may lead to a shock therapy and the concomitant losses.

Neo-evolutionary approach concentrates on the triple helix of functions instead of institutions: wealth generation, knowledge production and normative control. It studies possible synergies between these functions. From neo-evolutionary point of view, the three helices in the hypercycle model do not need to be coordinated into a central overlapping zone (see Figure 5).

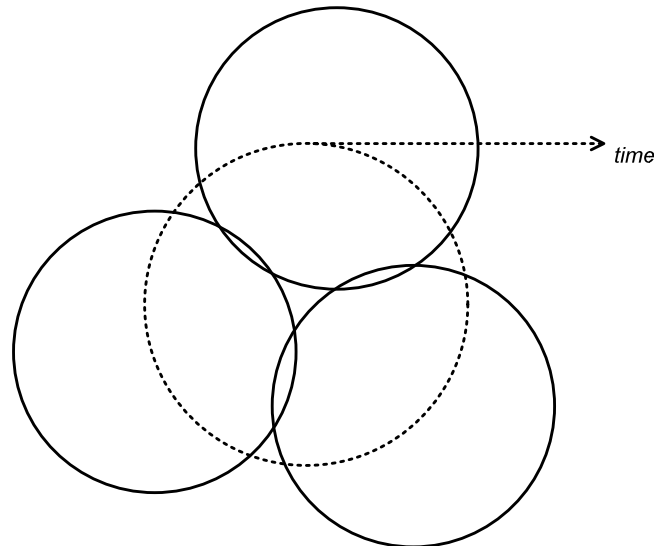


Figure 5. The Hypercycle model

Source: Loet Leydesdorff, 2012

All functions are highly interdependent: when two of the helices form bilateral relations, the third helix acts as a selection environment through having mutual relations with each of the first two and reduces the uncertainty in the system. Brought together, such selective environments form the synergetic mechanism, which enforces the systemness of an economic as well as innovation system and its ability for self organization [8]. For instance, when we study the interaction between two components of the TH model – knowledge production and wealth generation (that can be measured in absolute terms – applied patents, number of spin-offs, employed alumni, etc.), we have to consider that at the same time the third component – normative control can reduce the uncertainty in the system and increase the synergetic effect of such interaction by various means, like legal regulation, tax incentives, state grants, etc. In its turn, this leads to changes in the structure of industry and education thus the helices make another curl.



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Neo-evolutionary approach presents the Triple Helix model as “a dynamical mechanism, underlying a national (regional) innovation system and leading its transformation” [9]. The interrelation of neo-institutional and neo-evolutionary approaches is reflected in Table 1 [10].

Table 1

A (neo-)institutional versus an evolutionary appreciation of the Triple Helix model

	<i>Sub-dynamics</i>		
<i>Functions</i>	Wealth generation	Novelty production	Normative control
<i>Carriers</i>	Industry—University—Government		

Source: Loet Leydesdorff, Martin Mayer, 2006.

A single indicator of economic effect of TH model has not yet been created [8], therefore, currently the components are investigated and measured separately and then compared to identify the linear and nonlinear interaction and patterns. To measure the U-component the principles of bibliometrics and scientometrics are applied with related metering parameters – citation analysis, number of publications, citation indices, number of patents granted, etc. To measure the I-component (understood as a technology business that focuses on the introduction of high technology products in the industry) economic indicators are used, such as the number of high-tech enterprises, the volume of output of their new products, etc. At the junction of U-component and I-component the performance of high-tech enterprises and start-ups, including university spin-offs, are measured and compared with economic indicators. The G-component makes decisions on national and regional level that affect the statistics of the first two components [11].

In order to define the place of the G-component in the triadic TH model in Latvia it should be taken into consideration, that according to official statements of Latvian politicians during the last 20 years Latvia has built an open and liberal market economy [12]. Based on these statements, the neo-institutional laissez-fair model should be the best to describe the situation with the TH model of innovation development. According to Etzkowitz (2008), “in the laissez- faire model the role of government is expected to be limited to clear cases of so-called “market failure”. E.g., government can organize production of vitally needed goods or rendering socially important services when other market actors cannot do that due to some reasons: natural disasters, crises, too high production costs, lack of technologies and resources, etc. The extremely weak position of Latvia from the point of view of innovation development makes to think of such case of “market failure” and review the role of central and local governments in the direction of strengthening. As Ziegenblag and Monteanu mentioned in a report conducted for the European Commission, “Low demand and level on business R&D is one of the major burdens in Latvian innovation system, as there is a lack of communication and a mismatch between university research and industry” [13] – a case for the G-component’s interference.

Obviously, during the recession after the crisis of 2009 it is difficult for local governments to support entrepreneurs wishing to work in the field of R&D – they have no



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sufficient resources and legal framework for that. On the other hand, the gross domestic expenditure on research and development (GERD) dropped to 0.45% in 2009 (the EU average – 2.01%) and has not grown until now [14]. The G-component has to search a way to adjust the relations between U and I-components with less resources but nonetheless effective.

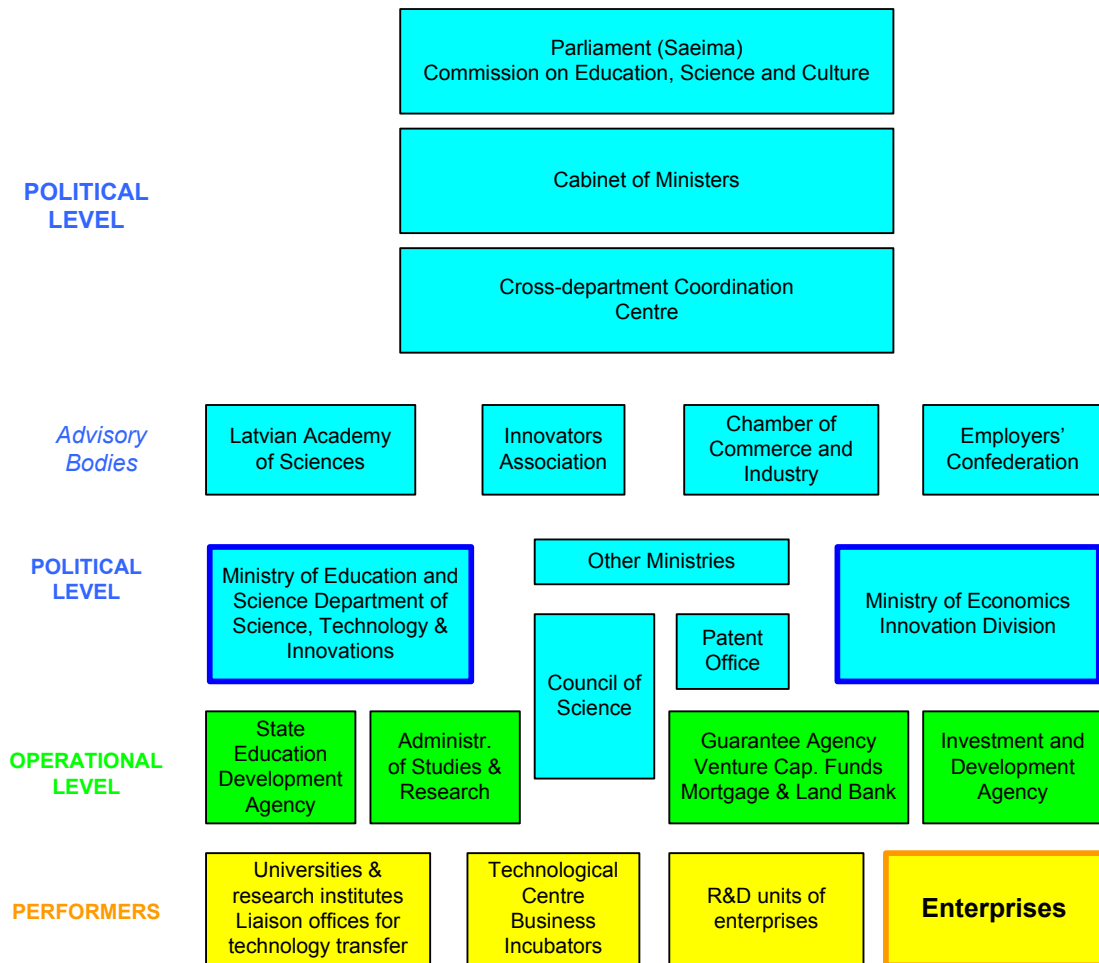


Figure 6. Organizational structure of Latvian System of Innovation, October 2011

Source: Kristapsons, Dravniece, Adamsone-Fiskovica, 2012

As it is seen on Figure 6, the present structure of Latvian System of Innovation is cumbersome and vague, there are many bodies, but the scheme of their linkage and communication, including horizontal, is uncertain; it is difficult to understand the structure of accountability, feedback and control.

On authors' opinion, the universities are to be the first addressees of central and local governments' attention and support, because, (1) "the university is the generative principle of



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the knowledge-based societies” [5] and (2) “the competitive advantage of the university, over other knowledge-producing institutions, is its students” [5]. Besides, Latvia already has a network of universities (Higher Education Institutions) located in the centres of all planning regions and major cities [15].

The G-component supporting universities in their aspect of the TH component of innovation development will solve the important economic and social issues simultaneously. Among such issues are:

- Growth of economic and science activities of universities in the area of the TH collaboration with local business can boost the economic growth of both private enterprises and regions, thus increasing the number of jobs;
- New offers may be made by universities in the market of educational services, that could lead to the attraction of foreign students, academic personnel, grants and investment;
- A strong university linked with an industrial cluster can increase the competitiveness of a region;
- The demographic situation of the country and regions can be improved by the increase of number of students and academicians engaged, besides the education process, to the regional processes of production, thereby increasing the number and quality of the workforce.

The investment to regional universities can be done in various forms and are not so big, as compare to direct investment in other industrial and/or infrastructural projects, though they may cause the synergetic effect that will multiply the value of the investment. This is the main idea and advantage of the TH model [8].

In the absence of the own resources, one of the possible sources of investment is EU funds [14]. At present, Latvia poorly absorbs EU funds intended to promote entrepreneurship and innovation. According to the European Commission, Latvia invests in entrepreneurship and innovation only 9.6% of the available resources [16]. Changes in the policy of use of EU financial support will also bring additional profit to regions. The re-direction of EU financial flows to universities may drastically help to solve the above mentioned issues.

In order to ease the funds sharing, the list of perspective priority industries must be reviewed and fixed on the level of a state programme. Now these industries are technologies, wood processing and design [14].

Conclusions and Recommendations

The innovation development of Latvia is far from the optimal. After the last crisis, “the government primarily focused on general economic support measures, and no innovation-specific extra measures were introduced” [14]. The Triple Helix model of innovation development is a model that can help Latvia to catch up more developed countries, to increase its competitiveness and competitiveness of the regions. Latvia has an open and liberal economy, therefore the direct support of exclusive market participants cannot be provided in substantial volume. Though, in accordance with the theory and practice of the Triple Helix model the central and local governments (G-component) can successfully participate in the development



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of state and regional innovation systems through the support of the universities as the generative principle of the knowledge-based economy. Such support may include the following steps among others:

- Local governments must become a catalyst for the convergence of science, industry and entrepreneurship at the local level that will lead to the development of favourable innovation environment and creation of new jobs in the regions. It may be done through development and adoption of a state wide-ranging programme of innovation development based on the TH model. This programme should include the list of priority industries based on predictive conjuncture, resource availability and possibility of resource obtaining;
- Local governments should provide universities (Higher Education Institutions) and involved entrepreneurs with moderate but targeted financial and organizational support in the framework of such programme;
- It is necessary to dramatically increase the efficiency of the use of the EU funds through the creation of promising local programs that must be worked out with obligatory participation of regional universities, entrepreneurs and local communities.

The abovementioned activities can bring the maximum synergistic effect with minimum investment, although it will require some intellectual resources. Organizational structure of Latvian System of Innovation must also be restructured in the near future to enhance its transparency, efficiency and effectiveness.

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