

INTRODUCTION OF TRIPLE HELIX MODEL IN LATVIA BASED ON EXPERIENCE OF SWEDEN, SINGAPORE AND SOUTH KOREA

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Abstract

In the absence of mineral resources and cheap labour, creation of innovations is a way for Latvia to develop a successful modern economy. The aim of the research is to study characteristic features and key ingredients of the Triple Helix model of university-industry-government collaboration in various countries and the potential applicability of their experience in Latvia. For purposes of the study monographs, scientific articles, official documents and bulletins of Latvia, Sweden, Singapore and South Korea, as well as international statistical data, and articles of local and foreign publicists were reviewed and analyzed. According to the hypothesis, the best option for Latvia is to elaborate the own Triple Helix model based on adopted and processed experience of Sweden (Laissez-Fair model), Singapore (Static model) and South Korea (Project approach). The results of research may be useful for local governments and universities for the development of environment and mechanisms aiming the creation of innovations.

Key words: *entrepreneurial university, innovations, Triple Helix model.*

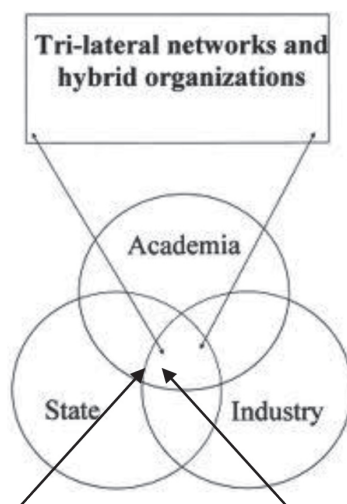
Introduction

In the time of globalization, information society and knowledge-based economy the production of innovations is not just an advantage, but a vital necessity for countries wishing to take their rightful place in the high-tech world. Globalization is a significant force reorganizing the world's economy through new knowledge and technology (Carnoy, Rhoten, 2002). Innovative development is imperative for Latvia (Eglītis, Panina, 2010b) and one of the major issues for the country as well as the catching-up development of the whole Latvian economy.

Innovation requires not only financial investment, but first and foremost intellectual investment, ideas and brains. If the level of intellectual capital in the country is not high enough, or targeted other purposes, one of the options in catching-up is borrowing success stories. Many politicians in Latvia consider the opportunity and necessity to learn from the experience of economic development of neighbouring Scandinavian countries. As a former Minister of Economy and a President of the Association of Latvian economists "Economistu apvienība 2010" Ojar Kehris announced: "There's no shame – we need to replicate the Scandinavian models" (Petrāne, 2012). But according to author's hypothesis, based on some reasons of historical and mental nature, the Scandinavian model of innovation development is a matter of

future. In the short term, the experience of several Asian newly industrialised countries may be more practical and feasible.

The innovation development directly depends on the intellectual capital that is created through the system of education, health care, social protection, reproduction of values and beliefs, “import of brains”, etc. “However, it is worth remember that in knowledge economy the main driving force is tertiary education” (Eglītis, Panina, 2010a). One of the modern models of innovative development that connects tertiary education, industry and society is a Triple Helix (TH) model of interaction among universities, industry and government that was worked out by Henry Etzkowitz and Loet Leydesdorff in mid 1990s. According to this model an innovation is an outcome of interaction between three institutions: state, industry and academia (see Fig.1). Three environments or functions are specified in the model: wealth generation (industry), novelty production (academia), and public control (government) (Etzkowitz, Leydesdorff, 2000).



Innovation Stimulated at the Focal Point

Figure 1: Classical Triple Helix model (Etzkowitz, Leydesdorff, 2000).

The path to TH begins from two opposing standpoints: a Statist model in which the government is controlling universities and industry (see Fig.2) and a Laissez-Faire model in which the three components are separated from each other and interact modestly across strong boundaries.

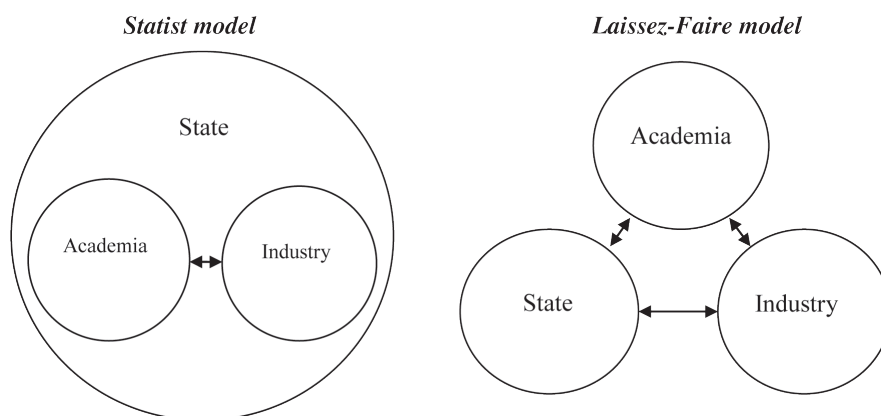


Figure 2: Statist and Laissez-Fair models (Etzkowitz, Leydesdorff, 2000).

The aim of the research is to study the characteristic features and key ingredients of the Triple Helix model of university-industry-government collaboration, aiming the creation of innovations in three countries: Sweden, Singapore, South Korea, and the potential applicability of their experience in Latvia.

The TH model in Sweden was studied by many authors including Etzkowitz and Leydesdorff, Benner and Sandström (2000), Danell and Persson (2003), Pin and Liu (2010), Fogelberg and Thorpenberg (2012); in Singapore - by Parayil (2005), Wong, P.-K. (2006), Wong, P.-K., Ho, Y.-P., Singh, A. (2006); in South Korea – by Salmi (2006), Shapiro, So, Park (2010), Chung (2011), Acha and Martin (2011). The aspects of the TH model in Latvia were researched by Ambrusevič (2008), Ozols and Ozola (2011), Ozols, A., Eglītis, J., Ozola, E. (2012a, 2012b). The TH model is studied at the Institute for Triple Helix Innovation (Hawaii, USA) and International Institute of Triple Helix (Spain).

Methodology of Research

The research is based on concepts of globalization, information society, knowledge-based economy, emerging markets, transitional economies, catching-up economies, entrepreneurial academic paradigm and entrepreneurial university.

In the framework of the research the review and analyses of scientific monographs, articles and scientific papers of local and foreign publicists was carried out. The data from official documents and bulletins of Latvian, Swedish, Singaporean and South Korean governments and Higher Education Institutions (HEIs), reports of international institutions and international statistics were examined, summarized and interpreted in order to formulate comprehensive interaction between state, business and academia. The applied part of the research was undertaken to verify the applicability of foreign experience in economic development in Latvia.

The results given in the research is the part of a wider research devoted to the application of innovation development models in the regions of Latvia.

Results of Research

In 2011 Sweden ranked the 1st in the EU in terms of innovation (IUS, 2012). It is a great example of employing the Laissez-Faire TH model (Etzkowitz, 2008). Swedish Governmental Agency for Innovation Systems (VINNOVA) uses Triple Helix concept as the theoretical framework for programs and policies fostering public private relationships (Jacob 2006). The Swedish Agency for Economic and Regional Growth (Tillväxtverket) also participates in TH activities.

Swedish policy has ambitions of finding a better balance between top-down and bottom-up initiatives implying a stronger regional focus (Coenen, Asheim, 2005), though the regional imbalance still exists - the three main urban regions Stockholm, Gothenburg and Malmö have about 75 percent of all R&D activities and outputs. They also have a more balanced supply of academic, governmental and private research activities than the smaller regions, and the interactions among sectors within these regions are more intense (Danell, Persson, 2003). According to the Swedish model, factors that can be unique to a certain place or region are the existence of specialised knowledge, local social networks and trust between the parties concerned (MIEC, 2004).

As one of the main bodies of research and development, Swedish universities, which rank top worldwide in getting public funding, highlight their responsibility in transferring knowledge into productivity based on the framework of TH model. The model of knowledge transfer within the TH model in Sweden is mainly state-pulled, corporate-pushed and university-coordinated

(Pin, Liu, 2010). Sweden has no officially proclaimed industries of the higher priority. Instead it announced an innovation strategy that implied:

- Innovation social climate;
- Knowledge base for innovation;
- Innovative trade and industry;
- Innovative public investment;
- Innovative people (MIEC, 2004)

To promote the TH model many other bodies besides state agencies were created, like a business incubator STING (Stockholm Innovation and Growth), Medicon Valley Swedish-Danish medical cluster, a Swedish-Danish cross-border initiative Øresund Science Region (ÖSR), Swedish-Norway innovation centres, etc.

Although there are many critiques of the TH model in Sweden (Tuunainen, 2002), it is one the most powerful national ideas considering innovation and economic development. It is becoming even more popular while many manufactures, including automotive are being moved to other countries (Etzkowitz, Klofsen, 2005).

Singapore is also among the countries of the world vanguard of innovative development. Being a poor British colony, after gaining full independence in 1965 Singapore has become one of the original “Four Asian Tigers” or Newly Industrialized Economies (NIE) alongside Hong Kong, South Korea and Taiwan. Between the mid-1960s to the 1980s the country was able to attract numerous Transnational Corporations (TNC) and Direct Foreign Investment (DFI). This made Singapore one of the most advanced and technologically driven economies in the world.

Table 1. Stages of Singapore’s Economic Development and National Innovation System Changes.

	1960s-1970s	1970s-1980s	1980s-late 1990s	From late 1990s
Economic Development	Beginning of DFI-Driven, Export led Industrialization	Transition to NIE	Transition from NIE to Developed Economy	Transition to Knowledge-based Economy
National Innovation System	Primary focus on developing Operative Capability to man Production	Primary focus on developing Adaptive Capability to support Process Technological Deepening	Primary focus on developing Innovative Capability to support applied R&D	Primary focus on developing Intellectual Creation and Commercialization / Entrepreneurial Capability to support Knowledge-based economic growth

Source: Wong, Ho, Singh, 2006

As it is seen from Table 1, in 2000s the focus of the national innovation system was made on the development and commercialization of intellectual capital. Since the mid-1990s the system of innovation development in Singapore faced the Triple Helix model. The government has set as its main objective the creation of an innovative environment through a strategic alliance between the companies, national research centres and universities, statutory boards and university spin-off companies (Parayil, 2005). Unlike Laissez-Faire TH model, the Singaporean model is focused on the universities, which were being asked to contribute to the economy in real time (Parayil, 2005).

State-owned National University of Singapore (NUS) became a leader of the new policy. For the new tasks its organizational structure was changed - besides traditional Provosts, a new position of Chief Executive Officer (CEO) was added, whose responsibilities include: communication and coordination with overseas colleges; management of Entrepreneurship Centre; industry and technology relations; venture support; consulting; extension, and publishing.

Accordingly, a special unit has been created: The Industry and Technology Relations Office (INTRO) responsible for formation and guidance of spin-off firms and incubation of high-tech start-ups (NUS, 2005).

Some authors underline that Singapore universities had to change objectively in order to meet the challenges of the universal globalization, information society and knowledge-based economy. A more rigid bureaucratic control by the state, a lower base of research and inventive outputs coming out of universities, and lower demand and the ability of private enterprises to commercialize university knowledge suggested that the pre-conditions for Triple Helix dynamic interactions were much weaker in Singapore than in the advanced economies. Therefore, the Singapore universities had greater urgency to take on an “entrepreneurial” role (Wong, Ho, Singh, 2006). They had to be more pro-active in commercializing their inventions through spin-offs and start-ups, rather than relying on outside private enterprises to license them. Similarly, they needed to undergo more drastic reform of their organizational structure and incentive system, in order to change the culture and mindset of their staff towards knowledge commercialization (Wong, Ho, Singh, 2006).

Moreover, universities in transitional and developing economies need to make a transition from the traditional university model to the “entrepreneurial” university before they can play an effective role in the Triple-Helix nexus for commercialization of science. Otherwise, the local universities risk being marginalized, as governments, in their haste to catch up in the global competition, put a priority on autonomous public research institutes (Wong, 2006).

Another factor increasing the role of universities in the innovation agenda in Singapore was a change of priorities in the area of industry. As part of the overall intensification of investment in R&D and innovation, the Singapore government announced in 2000 a strategic shift towards the promotion of biomedical science and technology as a leading sector in the economy for the 21st century. Plus in mid-2000s it was added with environmental & water technologies and interactive digital media (Biomed-Singapore, 2011).

The country, its industry and academia just had not enough educated people to achieve these goals. Therefore the government suggested for the local universities to take on an additional economic role: the attraction of foreign talents (Wong, Ho, Singh, 2006).

All these measures helped Singapore to become an “Innovation Nation”, demonstrating a fascinating example of how innovation stewardship can work (Kao, 2008).

Another country that achieved great success in economic and innovation development having begun with very low starting points is South Korea. Its GDP was less than in Somalia and Afghanistan in the 1960s (CIA World Factbook, 2012). In the beginning of 1980s the indicators of Industry and Agriculture of South Korea and Latvian SSR were comparable (DOCEX, 1992; KoStat, 2011). In 2011 South Korea was assessed the 13th world economy (CIA World Factbook, 2012). Being a great example of catching up development (one of its models called by a Japanese economist Kaname Akamatsu “a paradigm of “flying geese” (Akamatsu, 1962), South Korea used various methods and ways to promote its economical and social growth. Its development had several stages with different accents at each stage. At first, it used the comparative advantages, like cheap labour, natural resources, agriculture, and geographical situation. Then, during accelerated industrialization South Korea adopted some elements of planned economy and built a powerful diversified industrial sector based on big private industrial and export conglomerations (chaebols) which became locomotives of industrialization and further growth. In 1990s the government took a course to wide support of SMEs and innovative development having created geographical agglomerations of knowledge and industry (Ozols, 2011b). But the TH model has not been extensively applied in Korea before the middle of 2000s as the most studies of R&D there have traditionally been conducted in terms of the National Innovation System approach (Shapiro, 2007).

In 2006 the Korean government adopted the second stage of Brain Korea 21 Program

(2006-2013) to finance the selected University research projects, especially in the areas of technology development in collaboration with industry and development of regional balance. A Korean version of the TH model was called NURI (New University for Regional Innovation) Project. Only higher education institutions located outside the capital region could be the beneficiaries of the NURI funds. In 2009 this project was transformed into a World Class University (WCU) Project with allocation of government funding of US\$ 617 million. Together with it a 'High risk, high return' pioneer research project was started – government public investment in strategically important areas, especially basic research and advanced technology R&D in Biotechnology, Nanotechnology and brain research (Kim, 2010; Acha, Martin, 2011). NURI/WCU projects aimed:

(1) The strengthening of University/industry and University/regional authorities linkages which supposes the involvement of industrial sector and regional governments to the Universities' strategic planning, including industry representatives into the Boards of Trustees, participation of industrial practitioners in the creation of study programs, lectures of leading businessmen, specialists and managers, post-practice, consultations and joint projects with companies, science parks and incubators financed by private companies and local governments from regional budgets;

(2) Increase of Universities' role and participation in regional economies, priority of regional projects for Universities' researches and regional Universities in local grants, promotion of local innovative activity (Salmi, 2006).

Last year the President of the Republic of Latvia announced that during the last 20 years Latvia has built an open and liberal market economy (Bērziņš, 2011). In 2011 its GDP was ranked the 105th in the world, GDP per capita (\$15,400) – the 80th (CIA World Factbook, 2012).

According to ideas of J. Schumpeter, the main target of innovations is to get the oligopolistic rent over the market profit (Schumpeter, 1949). The rent is shared between entrepreneurs, banks, workers and state. Therefore, as a stakeholder of innovative development the government could benefit from the creation of innovation environment and support of innovative business.

"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, suggested: "... it is necessary to create favourable conditions for innovative development directed at employing internal intellectual resources... 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" (MRD&LG, 2006).

But in 5 years after adoption of this plan, in 2011 Latvia ranked 27th (the last) in the EU in terms of innovation, called a "modest innovator" (IUS, 2012). In 2011 Gross Domestic Product (GDP) expenditure on R&D (GERD) was 0.45% (the EU average - 2.01%), business enterprise expenditure on R&D (BERD) was 0.16% of GDP (the EU average - 1.21%), Summary Innovation Index score of Latvia - 0.201 (the EU average - 0.516) (Kristapsons, Dravniece, Adamsone-Fiskovica, 2012).

As it was noticed in a report conducted for the European Commission (EC): "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" (Ziegenblag, Montean, 2010).

The present structure of the Latvian System of Innovation is rather 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 (Kristapsons, Dravniece, Adamsone-Fiskovica, 2012).

One of the possible sources of investment is EU funds. But at present, Latvia poorly absorbs EU funds intended to promote entrepreneurship and innovation. According to the EC, Latvia invests in entrepreneurship and innovation only 9.6% of the available resources (Egle, 2012).

The “project” and innovation thinking, the ideas of neo-industrialization may be seen in the works of some Latvian economists and even in some Latvian government activities (e.g. Dombrovsky, 2010; Declaration of the Intended Activities of the Cabinet of Ministers headed by Valdis Dombrovskis from 11 March 2011). However, a single and coherent approach on the prospects of Latvian economy and innovation activities still does not exist, except the idea of the “invisible hand of the market”. The proclaimed priority industries in Latvia are technologies, wood processing and design (Kristapsons, Dravniece, Adamsone-Fiskovica, 2012).

As Latvia has no big stocks of mineral natural resources or cheap labour, and both the central government and companies cannot invest enough in innovations, the TH model is the most suitable for the country, because it may cause the synergetic effect and multiply the value of the smallest investment, thus affecting the growth of HEIs and regions competitiveness. It is a private public partnership where the HEIs play important role in creating new jobs.

According to some theorists of catching-up development, the later a country steps onto the path of catching-up movement the more is the volume of technologies and models accumulated by other countries which may be used to faster the economic growth (Fagerberg, J., Godinho, M., 2003).

In the author’s opinion, a Sweden TH model is not fully suitable for Latvia now for some reasons:

- ✓ Sweden has a long and uninterrupted history of market development unlike Latvia, that had a dramatic history in the XX Century – a part of Russian empire, an independent state with emphasis on agricultural development, a part of Soviet Union for 50 years, and only 20 years of the open market;
- ✓ In the beginning of 1990s due to the collapse of the Soviet Union Latvia has lost a big part of its industry and has not yet regained. At present, almost all Latvian enterprises are SMEs that have not enough capitals and sustainability;
- ✓ Lack of experience of capitalist economy and entrepreneurship in Latvia, remnants of paternalistic socialist ideology.

But being a member of the EU, Latvia cannot use the experience of Singapore (Statist model) and South Korea (Project approach) in full amount as well. Many of their activities are non-market and cannot be adopted in the EU (Ozols, 2011a). Therefore, the best way is to create a national TH model combining useful features of Sweden, Singapore and South Korean models.

In the Latvian TH model 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 the knowledge-based societies” (Etzkowitz, 2008) and (2) „the competitive advantage of the university, over other knowledge-producing institutions, is its students” (Etzkowitz, 2008). Besides, Latvia already has a network of universities (Higher Education Institutions) located in the centres of all planning regions and major cities (Latvijas Avīze, 2012). The target is to transform Latvian HEIs to entrepreneurial universities.

Conclusions

In the conditions of open market economy and membership in the EU, after the severe economic crisis Latvian government cannot directly support national companies, and Latvian companies have no money and margin of safety to promote the development of innovations. But the central and local governments can promote innovation policy indirectly, through the support of local HEIs in the framework of the TH model.

As a result of the study the authors issued the following recommendations for the politicians and executives on the application of specific aspects of innovation development in Latvia:

- Increase the role of central and local governments in the development and implementation of innovation policy;
- Review and approve the list of priority industries based on predictive conjuncture, resource availability and possibility of resource obtaining;
- Work out and implement a national program of innovation system development based on the Triple Helix model;
- Make the necessary changes and amendments to legislation relating to intellectual property rights and entrepreneurship promotion: spin-offs and start-ups, including tax breaks;
- Study the possibility of foreign talent attraction: students, researchers, faculties;
- Elaborate the evaluation methods of the effectiveness of HEIs;
- At the local level the assistance in the form of moderate but targeted financial and organizational support of local HEIs and entrepreneurs by local governments in the framework of the Triple Helix model may cause the synergetic effect and multiply the value of the investment, thus affecting the growth of regional competitiveness.
- Increase the efficiency of the use of EU Funds through the creation of promising local programs with participation of universities and entrepreneurs.

By studying, adopting and implementing the experience of successful countries Latvia can accelerate its economic and social growth without losses and damages inherent to pioneers. At present, some countries have accumulated sufficient experience in the use of the Triple Helix model of innovation development. It is possible to use this experience in Latvia immediately to the stage of practical application, taking into account local conditions.

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