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Managing innovation systems in transition economies

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Abstract

Successfully managing innovations has become the basic precondition for the development of both companies and national economies. At the national level governments are forming innovation systems whose primary goal is to create conditions at which science and technology can flourish and then transfer their findings trough private sector into new revolutionary products and services. Unfortunately not all countries have the same preconditions for creating such systems and transition economies due to many of their characteristics face serious difficulties. The aim of this paper is to first describe the role of innovations and innovation systems in economic development and then describe many problems transition countries face regarding this issue. After describing the main problems some of the measures that could be used to improve the current innovation output in transition economies are presented.

Keywords
national innovation system, economic development, transition economies

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1. Introduction

The terms innovation and innovativeness have become the new business "mantra" in many developed countries. It is well known that USA and in recent years EU (Lisbon Agenda) have proclaimed that their future development will be based mainly on new innovative corporate cultures and technologies. Since innovation represents the foundation of future economic development but also takes a lot of resources and can sometimes be a risky game it is logical to examine the current state of innovations in transition countries. The importance of innovations has long been recognised as can be seen from Table 1.

Table 1: Evolution process of large firms in the period 1960-2000

Market requirements	Performance criteria	Ideal type of firm
1960 price	Efficiency	The efficient firm
1970 price, quality	Efficiency + quality	The quality firm
1980 price, quality, product line	Efficiency + quality + flexibility	The flexible firm
1990 price, quality, product line, uniqueness	Efficiency + quality + flexibility + innovative ability	The innovative firm

Source: Bolwijn & Kumpe (1990)

In the last 10-15 years transition countries in Central and Eastern Europe (CEE) experienced major changes in their political and economic systems. These changes have a significant impact on organisations external environment and their competitive capabilities (Kubes & Benkovic, 1994). In the transition countries, the socio-economic context influencing the innovation system includes the whole process of transition towards the fast restoration of capitalism and its primary values - private ownership and democracy. As the restoration of these values was accomplished in a technical sense by privatisation and the multiparty system, the socio-cultural context of post-socialistic semi-modernism has remained largely unchanged (Svarc, 2006).

One of the problems most transition countries face in trying to expand to foreign markets is that their products are often considered "old-fashioned" and technologically poorly developed. The reasons for this phenomenon are very deep and come from the fact that years of supply driven economy made companies from transition countries very slow and rigid in dealing with their customers' expectations. In such market environment, there were no economic incentives for firms to develop the abilities such as flexibility and innovativeness. Not only that this fact disables them from concurring foreign markets but it even jeopardizes their pure domestic survival. A common characteristic of the transition countries is that the value added is stagnating at a level which is only a fraction of that in the EU, return on capital is low and does not allow investment in new technologies (Bastic, 2004).

Currently, the new EU member states are losing their traditional sources of international competitiveness, such as low labour costs (caused inter alias by their integration into the EU). Also, policy makers in the CEE countries are increasingly emphasizing the importance of building knowledge-based economies (Masso & Vahter, 2008).

In the first part of this paper national innovation systems and their importance are presented. The paper proceeds with short overview of current issues transition economies are facing regarding their innovation systems. Special attention is than given to the case of Croatia with emphasizing reasons that led to presently more than unsatisfactory state of innovations. The paper ends with presenting some of the measures that could help transition economies boost their innovation systems.

2. Main determinants of managing innovations

The role of innovations in scientific literature is proportional to their contribution in gaining competitive advantages which means one can find numerous approaches to this area of research. At the moment three

areas are especially emphasized and they are: (1) creating innovation culture, (2) national innovation systems and (3) research at the network level.

It has to be said that research at the network level often includes different regions such as: East Europe, North America etc. Innovative firms do not innovate alone but in the context of a network. Particularly with respect to formal forms of cooperation, the percentage of innovating firms that are involved in research and development (R&D) collaboration with one or more partners ranges, depending on country, from about 50% to–in the case of Denmark-97% (Capron & Meeusen, 2000).

In the current scientific debate, the term "innovation" is predominantly linked to the R&D associated with creating new products. There are many studies of innovation which reveal that the increased R&D activities lead to innovative products which enable companies to achieve competitive advantages and gain market shares (Armbruster et al, 2008). The importance of innovation as a driver of competitiveness, profitability and productivity is well documented in the literature (Porter, 1998). Sustainable competitive advantage can be defined as a competitive advantage that lasts for a long period of time because competitors are not capable of imitating the firm's source of competitive advantage (Jacobson, 1988).

There are also two most commonly used types of innovations and they are radical and incremental innovations. The first type is associated with doing new things and they represent the true advantage of company at national level. The second type is often described as doing things better and means working on maximising the effectiveness of a system or a company. Radical innovations are often realised trough product innovation while incremental innovations in most cases take the form of process innovations.

According to Padmore & Gibson (1998) science and technology cannot be researched without considering interactions between technological, economic, social and management systems. In coming to grips with this, researchers and policy makers have enlarged the context for discussion from science and technology to innovation, and now talk about "systems of innovation" or systems approach to innovation (Capron & Meeusen, 2000). The true idea behind the systems approach to innovation is that the range of knowledge required for developing new products and processes is generally beyond the capacity of the individual innovating firm. In accordance with this new innovation paradigm the national innovation system itself is locally specific and determined by local socio-economic surroundings, political surroundings and other societal and historical elements (Svarc, 2009).

It is clear that science and technology (S&T) and trends in S&T must, in some sense, be fundamental to the whole business of transformation. There can be no enrichment of human capital, no accretion to knowledge stocks, without S&T. But in this context S&T has to be understood in a very broad sense. It has to be understood to include education and training and all the myriad elements of design and organisation which mesh in with R&D properly at the level of the company and also in many areas of public administration (Dyker and Radosevic, 2001).

National innovative capacity can be defined as the institutional potential of a country to sustain innovation. One of the clearest indications of innovation performance is the rate of take-up patents issued by the US Patents and Trademarks Office-USPTO (Hu & Mathews, 2008).

There are three basic theories in innovation theory (Sundbo, 2001): (1) The entrepreneur theory, in which the entrepreneur's psychological factor is the innovation determinant and innovations are made by an entrepreneur trough the establishment of new firms. (2) The technology-economic theory, in which innovations are interpreted as technological innovations, and technicians and R&D activities are the producers of innovations. (3) The strategic innovation theory, in which innovation is a process in which the whole organization is involved and the strategy is the guideline for the process, which is steered by the top management. It emphasizes the strategic situation of the firm and sees innovation as a sociological process.

For a long time it has been considered that innovation is a linear process and the primary goal of governments at this time was to invest heavily in public research. One of the basic assumptions of this

approach was that private sector will not invest in R&D since it is risky and time consuming so this market imperfection had to be corrected. However the view towards innovation has lately been changed since spillovers and feedback effects often play an important role in innovation making it non-linear. According to this new view the role of government is to support the interaction between science and business so that research results could be converted into new technologies and innovations.

3. The problems of managing innovations in transition economies

The theme of technological and economic catch-up is also very popular among many researchers from transition countries. From that aspect Verspagen (1999) brings two main groups of factors which may inhibit catch-up through technological diffusion. They are: *technological congruence* and *social capability.* Technological congruence is defined as match between the technologies in use in the advanced country and those most fit for introduction in the backward country. This means that some technologies used in developed countries are just not suitable for transferring to transition countries due to a number of factors. Social capability is defined in terms of institutional factors such as educational systems (which supply the human capital necessary for assimilating spillovers), the banking system (which supplies financial capital for catch-up related investment), the political system etc. It is through innovation, strictly (hard) technological and (soft) organisational, that key deficiencies in social capability are made up. It seems unlikely at first sight that problems of technological congruence would present major obstacles to successful catch-up in the case of the post-socialist countries. While there is a real sense in which they are developing countries, their general levels of education are much closer to those of Western Europe and North America than those of the Third World. Literacy is virtually universal and basic engineering skills are well developed among a large proportion of their respective populations. Domestic markets are in many cases small, but regional integration schemas like the Central European Free Trade Area (CEFTA) and more important, the fact that a number of countries have realistic prospect of acceding to the EU, have ensured that this is not a major constraint on the establishment of technological congruence. A case of automotive industry and its transferring capacities to transition countries, which for them was very profitable, is a good example that while low wages provide trading opportunities, developed countries will not close off technological options in post-socialistic region. But the situation with the technological congruence is not as good as this example illustrates. While foreign car firms have met no serious obstacles in setting up state-of-the-art production systems employing mainly local people in their CEE transplants, they have found it impossible to integrate local firms into their supply networks as suppliers of complex components involving R&D and design work as well as production. Fagerberg & Srholec (2008) also point out that openness to trade and foreign direct investment (FDI) does not have to matter much for development. The conclusion is that poor countries due to lack of absorptive capacity are much less likely than other countries to benefit from FDI. According to Dyker & Radosevic (2001) there are two possible scenarios for the transition countries. Not all of them have the same starting position and that factor will influence their future economic development. The most likely scenario for the transition region as a whole over the next few decades, therefore, is a group of CEE countries clamping on at a level of economic development that is fairly high but still below the EU average; while the countries of the former Soviet Union and some of the Balkan countries will continue to fall behind, as they have done over the past decade, or at best establish a trajectory of week catch-up.

The main factors that will determine which countries will fall into which categories are presented in Table 2.

Table 2: The determinants of economic development for transition countries

Aspect	Measure
Science, research and innovation	Scientific publications, patents, R&D (total/business)
Openness	Openness to trade, FDI, technology licensing, immigration
Production quality/standards	ISO standards
Information and communication technology (ICT) infrastructure	Telecommunications, internet, computers
Skills	Primary, secondary and tertiary education, managerial and technical skills
Finance	Access to bank credit, stock market, venture capital
Quality of governance	Corruption, law and order, independence of courts, business friendly regulation
Social values	Civic activities, trust, tolerance
Type of political system	Democracy or autocracy

Source: Fagerberg & Srholec (2008)

The empirical analysis suggests that a well developed innovation system is essential for countries that wish to succeed in catch-up. There is a strong, significant and robust statistical relationship between (level and change of) GDP per capita on the one hand, and (level and change of) the innovation system on the other. Historical and descriptive evidence also suggests that countries that have succeeded in catch-up are given a high priority to this dimension of development (Fagerberg & Srholec, 2008).

Good governance is also critical for the ability to realise the desired economic results. Sometimes it is asserted that this is mainly a question of successfully "westernising" the political system. But research shows that a political system of the western type is shown to be conductive to growth among richer countries. For the poor countries it is, if anything, the other way around. In fact, among the countries that over the years have succeeded in catching up there are several examples of countries with institutional arrangements that differ a lot from western ideals, such as recent performance of China and Vietnam, the Asian Tigers before the 1990s or the pre-world-war-two Japan (Fagerberg & Srholec, 2008).

The involvement of private players is crucial for learning policy-making and achieving adaptability, which in turn is crucial for the overall success of an innovation policy. This is particularly important for transition economies facing important reforms in a context of accelerated globalisation and international competition (Inzelt, 2008).

In transition economies the majority of the emphasis has been placed on creating the applicable political and economic environment within which organisations can develop. Much less attention has been devoted to the people side of organisations (Leskovar-Spacapan & Bastic, 2007). There is also a discussion among researchers on weather internal or external factors have more impact on innovativeness. One argument for an emphasis on the internal driving forces as the core forces is that, even if the external forces are the strongest, they must be interpreted and converted into action by managers and employees. The main ideas for innovation are developed by employees when they interact with customers and observe their problems. Among internal driving forces three need to be marked as most important ones, they are: innovation-oriented culture, entrepreneurship and market orientation. Innovation-oriented culture is often mentioned as a core capability for innovation process. Creativity/innovation is truly enhanced when the entire organisation supports it. Structures in creative companies tend to be flexible, with few rules and regulations, loose job descriptions and high autonomy. The entrepreneurial firm is generally distinguished by its ability to innovate, initiate change and rapidly react in order to change flexibility and adroitly (Naman & Slevin, 1993). A market orientation is considered an important part of organisational culture. It puts the customer in the centre of the firms thinking about strategy and operation.

None of the CEE countries has a fully fledged innovation policy (IP). Hungary and Estonia stand out from the rest in terms of the range and longevity of their measures, while Poland and Slovenia have developed

relatively sophisticated policy documents, but are lagging behind in terms of their implementation (European Commission, 2002).

One of the solutions transition economies tried to employ was the pure copying of developed countries innovation models and incentives. Although this approach had many opponents and did not cause significant improvements in the short term, it played its part in breaking the popular perception of the market orientation as unworthy of true science.

Although corporate policy makers in large firms might often be tempted in the short term to avoid strong competition-and to reap extra monopoly profits-by merging with their competitors, the long term costs could be considerable. Public policy makers should be persuaded by the evidence that creating gigantic national champions does not increase innovation, quite the contrary, and therefore take countervailing measures. Lack of competitive rivalry makes firms less fit to compete on global markets through innovation (Bessant & Tidd, 2007).

Masso &Vahter (2008) compared the linkage between innovation inputs, outputs and productivity growth in Estonia in two different periods (1998-2000, 2002-2004). Their conclusion was that in the first period only product innovation had positive effect on productivity, while in the second only process innovation had positive effect. The explanation for this phenomenon, that can also be valid for the rest of the transition countries, was that after the loss of traditional export markets due to Russian crisis, product innovation might have been necessary to restructure and enter new export markets. In the second period, growing labour costs made it more important to reduce production costs through process innovation. Process innovation might have also been necessary to increase production in order to meet the growing demand during the period of strong macroeconomic growth.

4. The case of Croatia

According to last European Innovation Scoreboards from 2006 Croatia was in the last fourth group of countries called trailing countries. The present state is mainly rooted in socio-economic, cultural and political surrounding causing technological and economic development and not vice versa (Svarc, 2009).

Recent analyses of the CEE countries has revealed that innovation capacities confirm that growth in the transition countries has primarily been generated by defensive inter-sect oral restructuring, domestic market consumption and low-cost FDI, while technology accumulation, innovation abilities and the productive use of national research capacities have been neglected. To support the above mentioned points, four characteristics of current Croatian research system-which is the most substantive part of the innovation system in Croatia-are presented (Svarc, 2006):

1. *The weak industrial R&D sector and the low technological capabilities of companies.* The overall structures of the industrial sectors of the economy and exports have not significantly changed in last 25 years, and are still dominated by low-profit “traditional Croatian industries” such as the wood and textile industries, fisheries, tobacco and shipbuilding. The total business-sector investment in R&D amounts to 0.44% of GDP, which is extremely low in comparison to developed and fast growing countries where the business sector invests more than 1 or 2% of GDP, respectively.
2. *The Croatian research paradox.* Although GERD (global expenditure in research and development) in Croatia is satisfactory and creates the impression that the problems are not so much in the scientific inputs as in the outputs meaning Croatia suffers from ineffective use of research and science for technology development. The problem is much more complex and is based on a fact that Croatian research community lacks both a dynamic industrial partner whose needs could be met and a critical mass of innovative companies able to absorb the research expertise. The Croatian R&D paradox stems from inadequate and obsolete structure of the R&D sector, which is characterised by domination of the public sector over business R&D, because the latter was underdeveloped before and devastated during transition times. At the moment the ratio between public and private funding is 2:1, and it should be the

opposite (Samardzija, 2009). The data on human resources is even worse since 82% of researchers were employed in the public sector (Aralica, 2009).

3. *Inadequate science-industry cooperation*. It is estimated that today only about 10% of the revenues of the institutes and 6% of the revenues of universities come from research contracted with industry.
4. *The lack of a stimulating environment.* As the roles that innovation and knowledge-based growth factors play in economic development were not acknowledged, the establishment of a proper environment in which to facilitate innovation capacities and culture was also seriously neglected.

However, as the principal pattern of socialist style innovation activities involving the suppression of entrepreneurship, innovativeness and competition, which would stimulate a variety of technological trajectories, has not been changed, the outcomes of these policies are, to a differing extent, unfavourable to R&D and innovation capacities. Some of the most striking outcomes are as follows: the further weakening of the R&D market, the serious deterioration of industrial R&D with a corresponding low-level absorption capacity of firms and finally the shrinkage of the science base in terms of both human-resource capacities and investment in R&D (Prpic, 2002).

As it was mentioned earlier in this article, being open to FDI or even receiving large amounts of funds this way does not guarantee strong economic development. The way these resources are used and industries that are consuming them are far more important. In order to achieve economic convergence transition economies need not only to liberalize their financial and trade systems but also make sure these processes are followed by knowledge transfer. One of the basic indicators of this process is the R&D system convergence. Unfortunately in the case of Croatia, data for the period 2001-2003 reveal that low-tech sectors with limited spillover effects (tourism, real estate & trade) are still more important drivers of economic growth than dynamic medium- and high-tech manufacturing and services (Prasnikar et al, 2008). It is no surprise than that Aralica (2009) found almost 60% of businesses had no investment in R&D activities and were using only external knowledge.

Prasnikar et al (2008) suggest that in order to close the gap with developed countries technology follower countries such as Croatia should use the strategy of imitation or develop incremental innovations because technological competencies may be costly and time consuming to acquire. Only after years of accumulation of resources and knowledge trough incremental innovation could Croatian companies become serious players in the technological innovation field. This strategy also does not represent something new because many Asian countries are at the moment moving away after years of imitation into seriously competing in technology markets.

5. Conclusion

To overcome the gap originating from their history, companies from transition economies need to be aware that internal organisational capabilities such as innovation-oriented culture, entrepreneurship and market orientation are among important drivers of wealth creation and growth. Companies have to focus not only on their existing capabilities and on exploiting existing business opportunities but also have to develop, at the same time, capabilities they will need in the future . As in other transition countries (such as Hungry, Poland, Romania, Bulgaria, etc.), the political elite in Croatia, perusing the dominant “mantra” of the liberal market economy, cut off the state support for industrial institutes and left them to market competition or the care of their parent companies. As the large industrial companies, which were the only ones capable of R&D performance and absorption, were struggling with the problems of lost markets and privatisation, all creative, educational and research activities were considered as serious liabilities rather than assets. “Ironically, while “Western” states are more prepared to adopt state interventionist policies to foster innovation, post-socialist states regard intervention as a hangover from the past”.

At the end of the paper four measures need to be stressed as the key measures necessary for improving innovation output in transition economies. They are: (1) Creating innovation culture in all organisations trough stimulating and making people comfortable in delivering new ideas. (2) Supporting development

trough small innovative companies instead of creating big national champions. (3) Further involvement of private sector in research and technology. (4) The role of the government in stimulating R&D has to be greater not lesser for all transition economies.

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