Building Innovation Capacities in New Europe: Role of Public Policy

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Abstract

One of the priorities of the European Union is building of knowledge-based economy. However, Eastern enlargement has widened gap within the EU member states in innovation performance. In order to build innovation capacities in Central and Eastern Europe, issue of the role of public policy to facilitate innovation is of particular importance. However, preliminary evidence suggests, that new Member States are pursuing rather narrow approach to innovation policy with little relevance for overall socio-economic development of these countries. Narrow innovation policy is a result of historical legacies and mechanical copying of some elements of innovation policy from more developed Western countries. In order to tackle innovation needs in new Member States, policy-making has to be based on a better understanding of innovation process.

Keywords: innovation policy, Central and Eastern Europe

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Introduction

Schumpeter argued that process of innovation in its broadest sense is a driving force of capitalism stating that "the fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates"[1].

The crucial role of innovation is also recognized by the European Union, which in many of its policy initiatives emphasizes importance of innovation for international competitiveness of the EU as well as for internal socio-economic cohesion within the EU. Special attention to the role of innovation is also devoted in the Lisbon agenda, which declares EU strategic aim to become the most competitive knowledge based economy by 2010.

However, with the Eastern enlargement in 2004, differences in innovation performance within the EU have increased. Considerable gap in innovation performance exists between old and new EU Member States[2]. According to the European Innovation Scoreboard 2005[3], it will take approximately 10 years for Hungary and Slovenia to catch up to the EU 25 average innovation performance, while for other new member states it will take even more. According to simple linear extrapolation of their current performances and growth rates, it is expected that Lithuania and Czech Republic could reach the EU average innovation performance in more than 20 years, Latvia – in 40 years, while Poland and Slovakia – in more than 50 years. At the moment, new EU Member States are lagging behind on many innovation indicators (e.g., private investment in R&D, share of innovative enterprises, patents, trademarks).

In the situation of considerable gaps in innovation performance between old and new member states issue of the role of public policy in closing innovation gap becomes particularly relevant. Importance of innovation policy today has been widely recognized. Some authors even argue that innovation policy is one of the last resorts of active national economic policy[4]. It has been emphasised that innovation policy is now more important than before because globalisation and liberalisation of financial markets has drastically limited the autonomy of general economic policies like budgetary and monetary policy[5]. According to Lundvall and Borras, the loss in autonomy in trade, monetary and finance policy gives a more important role to labour market policy, social policy, education policy and, not least, innovation policy, as essential factors for guaranteeing sustainable economic growth under these new conditions. In this situation, "the increased importance of innovation reflects the fact that it represents a major response to intensifying competition by enhancing the learning abilities of firms and workers. Neither firms nor regions can establish sustainable growth without innovation and learning"[6].

In case of Central and Eastern European countries (CEECs) innovation policy is an important tool for their socio-economic development. Although these countries have experienced high growth rates during the last fifteen years, this growth has been led by, first, consumption goods based on purchase or copying of western goods, and, second, resource depletion[7]. Innovation and technological upgrading might play an important role in sustaining economic growth and catching up with Western countries.

However, in case of CEECs important issue is what kind of innovation policies would be appropriate to these countries taking into account that these are lagging behind and catching up countries. Preliminary evidence indicates that new Member States pursue rather narrow innovation policies, which are focused on high-tech industries and small number of large enterprises. Moreover, they often carbon copy priority areas from more advanced Western economies, which prioritise biotechnology, information and communication technologies, nanotechnology, etc. Such policies in economically less developed new Member States might lead to creation of 'islands of excellence' or 'cathedrals in the desert' with little relevance for overall socio-economic development of these countries.

The aim of this paper is to study the role of public policy in closing the existing innovation gap between old and new EU Member States. The paper will address the following research questions: What is the role of innovation policy? What kind of innovation policies exists in new Member States? What are shortcomings of existing innovation policies?

The paper will proceed as follows: firstly, concept of innovation is introduced and rationales for policy intervention are discussed; secondly, different understandings of innovation policy are analysed; and, thirdly, innovation policy in Central and Eastern Europe is analysed. Finally, main conclusions will be summarised.

Innovation process and rationales for policy intervention

According to Dodgson and Bessant (1996), 'innovation is the process through which firms seek to acquire and build their distinctive technological competences, understood as the set of resources a firm possesses and the way in which these are transformed by innovative capabilities'[8]. All firms need to look outside for inputs to the process of building up technological competence. The process through which technology moves from outside sources to the organization is called 'technology transfer'. Thus, technological competence requires transfer of resources and capability on the part of recipient to do something useful with that resource. Innovation process, as defined by Dodgson and Bessant, involves several stages: initial recognition of opportunity or need; search; comparison; selection; acquisition; implementation; and long-term use (involving learning and development). The results of successful innovation process are new products, processes, etc. Dodgson and Bessant identify number of factors, which encourage innovation: a thriving science base, an educated and highly skilled workforce, a range of intermediary organizations interlinking the science base and industry, strong managerial competencies within firms, receptivity towards external know-how within firms, availability of seed, venture and risk investment capital, good information and communications technology infrastructure, etc[9].

Edquist (2001) emphasizes that the market mechanism and capitalist firms best fulfil most economic functions in a modern society[10]. However, he adds that sometimes there are reasons to complement or correct (but not replace or duplicate) the market and capitalist firms through public intervention. As regards technical change and innovation, Edquist points to two conditions for public intervention in a market economy. Firstly, the market mechanism and capitalist actors must fail to achieve the objectives formulated; a *problem* must exist, which is not automatically solved by market forces and capitalist actors. Secondly, the state (national, regional, local) and

its public agencies must also have the *ability* to solve or mitigate the problem. If the public sector does not have the ability to solve or mitigate a problem, there should be no intervention, since the result would be a government failure. Edquist reminds that issue of what should be performed by the state or public sector and what should not is not subject to ideological judgements, but could and should be discussed in an analytical way.

Thus, identified problems and 'failures' are rationales for innovation policy. Keith Smith mentions four types of 'failures': failures in infrastructure provision and investment; transition failures; lock-in failures and institutional failures[11]. Firstly, failures in infrastructure provision and investment arise when there is problematic under-investment in two types of infrastructure with which firms interact, namely, physical infrastructure (like communications and transport), and science-technology infrastructure (like universities, regulatory agencies, publicly supported laboratories). Public action should be directed towards setting up incentives for and controls on private provision, subsidies for private provision or direct public provision. Secondly, it is possible to talk about transition failures when firms are highly competent within their own technological area but not in other related areas. Public action generally aims to solve this problem implicitly and devise special measures for this type of failure. Thirdly, lock-in failures are situations when firms are not able to switch away from their existing technologies and get 'locked-in' to a particular technological paradigm or trajectory. The rationale for public action is to generate incentives, develop technological alternatives and nurture emerging technological systems in order to make it easier for firms to move away from lock-ins. Finally, institutional failures are present when the institutional and regulatory context is having an unexpected and negative impact on innovation in the system. Public action here should concentrate on monitoring and assessing regulatory performance.

Different typology of failures has been developed by Dodgson and Bessant (1996), who identify various failures in technology transfer as an absence of certain capabilities at firm level[12]. They have identified following technology transfer problems:

- Inappropriate choice of technology. In this case firm lacks adequate capabilities in searching, selecting negotiating;
- Acquisition of technology hardware but inability to implement this successfully – lack of skills, supporting know-how, etc. Firms are missing capabilities in negotiating, implementing, integrating;
- Entry into a joint venture but no long-term learning or absorption of technology or development of competence. Learning and integrating capabilities are absent;
- Acquisition of inappropriate technology – lack of fit with existing operations or technology base. Aligning capability is missing;
- Acquisition of technology with no or little impact on competitive performance. In this case firms lack capabilities of aligning and combining;
- Unforeseen problems in using and deploying technologies acquired from outside. Selecting and implementing capabilities have to be developed.
- Late or non-adoption of critical technologies points to missing capabilities in searching and selecting.

To sum up, various problems and failures in innovation process create a need for policy intervention. Thus, the next question is: what is innovation policy?

Innovation policy: changing theoretical assumptions and their practical implications

Design of innovation policy has to a large extent been influenced by changing theoretical assumptions about the nature of innovation process. Two main understandings of innovation process can be distinguished – old linear model of innovation and more contemporary non-linear (chain-link, networked, interactive, systemic) model of innovation. According to the old model innovation process was generally perceived as a linear progression from scientific discovery, through technological development in firms, to the marketplace. This concept of innovation assumed that "more R&D in" resulted in "more successful new products out". Little attention was paid to the transformation process itself or to the role of the marketplace in the process[13].

According to non-linear model, innovation is a process of know-how accumulation, or learning process, involving elements of internal and external learning. Internal learning involves learning by developing, testing, making, failing, using in vertically integrated companies as well as cross-project learning. External or joint internal/external learning involves learning from the literature, competitors' actions, acquisitions or new personal and learning from/with suppliers, lead users, the S&T infrastructure as well as learning through horizontal partnerships, reverse engineering, customer-based prototype trials, servicing/fault finding[14].

Important role in contemporary understanding of innovation process is played by concept of 'system of innovation', which emphasises complex interaction between institutions and economic structure promoting innovation. System of innovation is constituted by "elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge and that national system encompasses elements and relationships, either located within or rooted inside the borders of a nation state"[15].

Changing understandings of innovation process have also changed understanding of appropriate innovation policy design. Linear model of innovation implied that one of main tasks of public policy is to support basic science. Traditionally, report by Vannevar Bush (1945) has been seen as one of classical statements in favour of policy thinking based on linear model. In his report, Bush stated that "the simplest and most effective way in which the Government can strengthen industrial research is to support basic research and to develop scientific talent"[16]. This type of policy thinking is characteristic to traditional science and technology policies, whereas 'science' policy is concerned with the development of science and the training of scientists, and 'technology' policy has as its aims the support, enhancement and development of technology, often with a military and environmental protection focus[17].

In the mid- and late-1990s in most Western European countries new theoretical ideas about non-linear process of innovation led to emergence of innovation policy[18]. In general, innovation policies are aimed at improving the capacity to innovate of firms, networks, industries and entire economies. According to Dodgson and Bessant (1996), innovation policy's principal aim is to facilitate flows of technology and information between multiple actors, including firms of all sizes and public and private research institutes. Innovation policy includes elements of regional policy,

infrastructure policy, educational policy, etc. Typical tools of public policy to support innovation involve direct financial support: grants, subsidies, loans, provision of equipment or services, loan guarantees; indirect financial support: schemes encouraging investment in innovation, venture capital; information: information networks, advisory centres, consultancy services, specialist libraries, databases, liaison offices; scientific and technical infrastructure: public research laboratories, research associations, learned societies, research grants; educational infrastructure: general education system, universities and polytechnics, technical education system, apprenticeship schemes, retraining system; public procurement: central and local government purchasing and contracts, R&D contracts, etc. Innovation process can also be supported with such instruments as taxation, regulations (e.g., patents, environmental control), public enterprise (e.g., innovation in public-owned industries), political (planning, regional policies, honours and awards for innovation, encouragement of mergers or joint ventures), public services (e.g., innovation in public services such as telecommunications, transport, health care) and trade (trade agreements, tariffs, currency regulations)[19].

According to non-linear understanding, innovation process is based on complex causal relationships. Therefore, it is particular challenge for policy-makers to design appropriate tools to facilitate innovation process. Typical failure factors in innovation policy are related to simplistic assumptions about the way in which technology is transferred; inability to think of innovation as systemic process; limited scope in methods, high levels of centralization, management by a singe agency; lack of attention to sector, region or firm specific variation in needs; lack of mechanisms for reviewing and modifying policies within the period of operation, etc. Successful innovation policy would involve clear understanding of the process – beyond the linear model, formal evaluation against a wide range of performance criteria; international exchange of experience, etc[20].

However, it has to be mentioned that shift towards innovation policy paradigm does not mean abolishment of previous science and technology policy but rather a broader approach to innovation issues. Borras (2003) notes that there is a cumulative process, since the new policy paradigm encompasses previous ones. That is, innovation policy encapsulates the objectives and instruments of both science and technology policies[21].

However, in practice broader approach based on non-linear understanding of innovation policy has not always been implemented, and certain inertia exists in favour of narrow approach based on linear understanding. There are various reasons for this inertia in policy-making. Lundvall and Borras (1997) present two reasons. Firstly, the most of the economists now working in Ministries of Finance were trained in a version of neo-classical economics that systematically misspecified the role of technology in their models. Secondly, the old dominance of neo-classical economics has a negative impact upon the policy debate through its lasting imprint on terminology and conceptual frameworks. Concepts such as market failure, externalities and spill-overs tend to focus the attention on just one side of the learning economy and hamper the understanding of the new economy where networking, interactive learning and communication are absolutely central[22].

Banchoff (2002) emphasizes another important reason for inertia in research policy, namely, the force of institutional legacies. According to him, old research policies

generated clienteles attached to the status quo because research funding have spawned powerful policy networks of firms, universities and public laboratories relying on public funding. These networks have established links to civil servants and politicians creating powerful political coalition opposed to shifting research policy off its established path. These institutional legacies undercut efforts to change the policies[23]. Thus, there are strong vested interests in favour of old linear model, which are lobbying for narrow policies favouring science and technology.

Sanz Menendez and Borras (2000) indicate one more obstacle to innovation policy reforms. They remind that conditions of policy innovation usually emerge when there is a persistent perception of "failure" of the previous policy. However, in areas like RTD policy, detecting the effects of the previous policies could take many years. Thus, the pressure for change in innovation policy emerging from analytical point of views need to be complemented with the construction of new coalitions that could change the balance of existing vested interest[24].

To sum up, although a strong theoretical basis exists in favour of non-linear innovation, in practical policy-making from time to time old-linear model still shows up favouring narrow approach to innovation policy. Thus, innovation policy in practice often is not decided only on analytical basis but also is influenced by ideological assumptions and vested interests.

Innovation policy in Central and Eastern Europe

During the transition period in 1990s innovation policy was largely neglected in CEECs. There were several reasons for this negligence: priority was assigned to macroeconomic reforms (privatisation, liberalization and de-regulation), political agenda was overloaded with short-term problems and ideologically extreme market approach dominated assuming that most if not all problems would be solved by free market. Since the late 1990s, importance of innovation policy increased. Policy-makers have learned that free market also has its shortcomings and failures. Moreover, innovation policy has increasingly been seen as a tool for catching up and building knowledge based economy. EU enlargement has also been mentioned as one of reasons influencing shift towards more proactive innovation policies[25].

However, design of innovation policy in new member states is strongly influenced by tension between narrow and broad approach to innovation policy. Preliminary evidence suggests that strong elements of narrow approach to innovation policy exist, which favour linear model of innovation. Radosevic and Reid (2006) argue that innovation policy in CEEC is dominated by high-tech bias, which ignores the reality of the need to promote the diffusion of technologies throughout of economy. Most national strategies in CEE cite biotechnology, materials technology and ICT as 'national strengths'. Policy makers in the CEECs would often declare that their country's research and technological development (RTD) priorities are EU priorities, which effectively means carbon copying of EU RTD Framework Programme priority areas. Such approach implies focus of innovation policy on small number of large companies but leaves majority of firms (mostly SMEs) untouched by innovation policy[26].

The main reasons, which support narrow approach to innovation policy, are, firstly, strong institutional legacies in favour of linear model of innovation, and, secondly,

lack of understanding of innovation process among policy-makers, which leads to mechanical transfer of some elements of innovation policy from more developed Western countries.

In CEE, there are strong legacies of socialist Science and Technology Systems, which strongly emphasised basic science and where science was largely separated from production process[27]. Comparing adoption of new innovation policy ideas in Western and Eastern European countries, Biegelbauer and Borras (2003) admit that Central European countries (Slovenia and Hungary) have felt the least impact of the new innovation policy ideas. According to them, for both Hungary and Slovenia an important reason for the hesitant adoption of the new innovation policies seems to be the small interest available on the side of the policy-makers and the political elite at large about the ventures of RTD – despite the number of discussions and documents of the first half of the 1990s, which seemed to show an impact of the discussions led in Western European countries about the innovation paradigm. Most political elites did not see the innovation policy paradigm as a politically viable way to 'modernize' their countries. However, the another reason for the two countries' policy evolution seems to lie in the general inertia and vested interests of the existing and well-established institutions which tried to block policy changes in fear of losing (even more) resources[28].

Acha and Balazs (1999) argue that the socialist model of innovation is still shaping innovation policies in the CEE and is evident in the way that policy makers conceptualise innovation, i.e., in policy design, language, measurement and institutional design. They outline three reasons for the persistence of the socialist model based on linear understanding of innovation: (1) the model is embedded in these societies; (2) the policy tools and targets associated with model remain unchallenged; and (3) vested interests amongst policy makers and researchers encourage a continuation in policy focus. Acha and Balazs argue that the persistence of socialist model of innovation may harm the long-term economic performance of the CEE. Moreover, according to them current innovation policies based on this model in CEE are yielding limited benefits[29].

Another problem in the new EU member states is the attempts to copy mechanically some elements of innovation policy from more developed Western European countries. Mechanical copying can be explained by lack of understanding of innovation process among policy-makers. In such a situation popular stereotypes of innovation and knowledge-based economy, e.g., high-tech, Silicon Valley, prestige, dominates over in-depth analysis of innovation needs in a specific socio-economic context. Havas (2006) emphasizes that impacts of the high-tech myth are more severe in Central Europe than in Western Europe because high-tech myth diverts policy-makers' attention from tackling the catching up challenge by assisting firms in developing their innovation capacities, and, in turn, their competitiveness[30].

Several authors have criticized attempts of CEECs to use high-tech industries as a vehicle for rapid economic growth. Von Tunzelmann and Nassehi (2004) remind that the fact that East Asian countries have used these sectors to develop so rapidly does not mean that strategy can be generalised by straightforward imitation. They mention two main reasons for their scepticism of assigning high hopes to high-tech development in CEECs. Firstly, the amount of output and employment generated in

the high-tech sectors is surprisingly small – in Western Europe, narrowly defined, they contributed only about 3% to GDP and employment, a figure which rises to about 8% if medium-high-tech industries are included. Even doubling these sectors is thus going to have comparatively little effect as compared with, e.g., raising productivity across the board in the huge service sectors. Secondly, the competition in these high-tech sectors is intensifying, and returns from their less complex facets, which were the points of entry in East Asia, have diminished to quite low levels. The more complex parts remain highly profitable in many cases, but do not provide easy entry points for a catching up country[31]. Von Tunzelmann and Nassehi (2004) suggest that a more viable strategy for most countries would be to target the use of high technology in a much wider range of industrial and service activities. These are what comprise the bulk of GDP, so the impacts may be far greater. Also, countries can build on their competitive strength rather than attempting to elbow into areas where competition from countries with more abundant knowledge-based resources is already acute.

Therefore, several authors remind that important task of public policy is to facilitate innovation not only in high-tech sectors but also in low and medium-tech (LMT) industries. LMT activities account for more than 90% of all economic activity in Europe[32]. Moreover, all LMT industries (furniture, textiles, food processing, etc) are innovative: they generate significant portions of their sales from new and technologically changed products and they use not only practical knowledge and high-grade design skills but also engineering and scientific knowledge. Therefore, it is argued that future of European economy will continue to rest on LMT.

To sum up, in many cases systemic approach to innovation policy which would be based on realistic assessment of strengths and needs of CEECs is still missing. At the same time, gradual shift towards broader approach to innovation policy is taking place, e.g., by introducing enterprise oriented innovation support measures within the framework of EU Structural Funds.

Conclusions

The main role in innovation process is played by market mechanisms and capitalist firms. However, in case when market mechanism does not fulfil its function, policy intervention can contribute to the solution of problems or ‘failures’. However, an important precondition for policy intervention is capacities of public administration to solve the problem.

As the new EU Member States are considerably lagging behind on many indicators of knowledge-based economy, issue of policy intervention to address existing problems and ‘failures’ is of particular importance. However, another issue is if public administration in CEECs has enough administrative capacities to remedy existing problems and ‘failures’: adequate information of the market, systemic understanding of innovation process, skills to design and implement appropriate innovation support schemes. Preliminary evidence of existing innovation policies in CEECs demonstrates limited administrative capacities in innovation policy-making with lack of understanding of innovation process, inadequate analytical capacities and poor implementation skills. Policy-making based on misconceptions of innovation process and needs might lead to ‘government failures’ and waste of public resources instead of contributing to long-term socio-economic development of these countries.

Although innovation policy is predominantly an issue of member state competence, the EU is also becoming increasingly active in this policy area through policy coordination process introduced by the Lisbon agenda based on benchmarking, policy learning, choosing 'good practice'. In order for new Member States to benefit from supranational policy learning process, the EU should be sensitive to needs of CEECs which are still lagging behind on many parameters of knowledge-based economy. Thus, supranational policy coordination exercises should aim not only at international competitiveness of EU but also at internal cohesion within the enlarged Union.

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