

# Introduction

## Key issues of the book

The aim of the book was to review recent research results in the sphere of knowledge and innovation processes in Central and East European (CEE) economies, especially in Visegrad countries (V-4, namely: the Czech Republic, Hungary, Slovakia and Poland).

The volume covers large parts of the issues which are connected with the knowledge economy, as it was called by OECD and the World Bank, namely with R&D, innovations, innovation policy, education (incl. human capital), foresight, e-business etc. However, it is not entirely about the knowledge economy. This notion is still underdefined and, probably because of this, it receives relatively small attention from quantitative economists, but is very popular among descriptive economists of the region (CEE), especially Poland. The book is not limited to innovations but refers also to knowledge processes, including e.g. human capital issues. Both processes seem to be important for the future development of countries.

The key questions of the book were as follows:

- » do knowledge and innovation contribute to the development of CEE countries?
- » is the distance between (esp.) the V-4 countries and the EU growing or decreasing?
- » are knowledge and innovation priorities included in policy agenda in CEE as factors of further economic growth?
- » do industries and companies appreciate benefits from knowledge and innovation activities and draw more attention to them?

In response, we can say that “yes”, the knowledge and innovation contribute to the development of CEE countries. However, this influence is very limited, as their growth is still based on “old” resources. That is also why the distance between the V-4 countries and the EU is decreasing; nevertheless, large part of this convergence process is caused by traditional, “old factors”, also connected with the transition (industrial restructuring etc.). Knowledge and innovation priorities are more frequently included in policy agendas, also on a regional level; still in a number of cases they are limited to slogans and the interests of sectoral or local lobbies prevail. There are some very successful cases of implementation of knowledge and innovation in companies (e.g. Hungarian Megatrend). However when we speak about larger sets of companies, we receive a different picture – these processes are still very limited just as are the linkages between business and academia.

## Overall conclusions of the book

Going through particular chapters of the book, we can find some other, common points:

- » The authors of the theoretical chapters seem to distinguish two phases of development of European countries in the context of transition processes:
  - the first – based on traditional sectors and post-socialist restructuring, and
  - the second – when after reaching a certain threshold countries can drive their growth and convergence processes basing on ICTs, human capital and R&D activity.

It also seems that the CEE countries have not reached that threshold yet. Thus, these countries should prepare themselves to the next transition – into the knowledge economy.<sup>1</sup>

- » There are findings indicating that knowledge and innovation are the factors of growth of CEE countries but their impact (though limited) is influenced by, e.g., geography and development of ICTs (Dyker, Guzik and Micek, Piątkowski and van Ark).
- » Network cooperation is important for the firms' development in transition countries (Dyker, Szalavetz).
- » This book provides a clear picture that not only economy itself but also different policies have influence on growth and competitiveness of the European Union. The new EU member states should especially develop the policies related to the knowledge economy, e.g.:
  - research policy,
  - innovation policy,
  - education policy,
  - industrial policy towards creation of clusters,
  - and coordinate them.

EU should play a larger role in the coordination process, including influence on regional policies. It is because the policy-makers often forget about the long-term goals (e.g. those set in the Lisbon Agenda), concentrating on short-term problems instead and directing large parts of the EU funds to satisfy sectoral and regional lobbies (Dratwa, Dyker, Rehak and Sokol).

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<sup>1</sup> A postulate which have been presented by Zdzisław Sadowski (2001), former head of the Polish Economic Society, since 2000.

- » It is very difficult for the former socialist countries to introduce policies encompassing the knowledge and innovation processes. The first barrier is connected with awareness of policy-makers who on seeing fast development without R&D efforts (e.g. the “growth paradox” of Slovakia) often neglect creation of innovation systems. The second problem is connected with inertia of the post-socialist scientific systems: universities are usually very conservative and without state stimulation are not very eager to cooperate with business, especially while still having publicly funded grants (frequently not for applicable but for basic research). It again leads to calls for more active role of Brussels in promotion of realization of the Lisbon agenda in post-socialist countries (Rehák and Sokol).
- » Although the book focused on the knowledge and innovation processes, important for growth are not only policies related to them, but also institutions e.g. responsible for innovation policy (with regulations) and competition policy (Piatkowski and van Ark, Frank and Jeck). There is often a lack of them in transition countries.
- » The research system in Europe is still very fragmented and a stronger cooperation towards creation of European Research System should be introduced (Dratwa, Delanghe and Vanslebrouck).
- » Although the policies with their coordination are important, we still do not have sufficient / proper measures of, e.g., knowledge economy or research policy improvement. Thus, the works on research on research systems and foresight should be intensified and the results included in development policies (Dratwa, Okoń-Horodyńska, Piech, Schuller).
- » Following this conclusion, we should recall the surprising conclusions that the policy-makers should concentrate more on creation of pro-innovative working environment and cluster culture based on trust and exchange of knowledge and innovation, rather than on an increase of R&D expenditures only (Dyker; Kaderabkova and Cicha). And, speaking of them, we should remember that the policy-makers should first of all stimulate the increase of the business R&D expenditures (Witkowski).
- » Luckily, there are some leading methodological approaches, e.g. of the World Bank Institute or the European Innovation Scoreboard, which become the main guideline (and benchmark) for V-4 countries in knowledge and innovation policy areas (Kaderabkova, Piech).

## Overview of the book

The **first part** of the book includes three chapters of a rather theoretical orientation, studying the relations between knowledge economy (esp. ICTs and R&D) and growth, especially in Central and East-European countries.

It starts from the chapter by Marcin Piatkowski and Bart van Ark, which investigates the impact of technological change and structural reforms on the productivity performance of ten post-communist New Member States (NMS) of the European Union and Russia, relative to the EU-15 and the U.S. during the 1990s and early 2000s. The authors use the TFP approach and run a regression analysis. They note that the analysed countries (except Romania) have already exhausted convergence opportunities based on ICTs, influencing productivity directly. They distinguish between two phases of convergence, from the point of view of ICTs contribution:

- » the first – relying on restructuring of companies, partly driven by FDIs and macro-economic stabilisation reforms, building institutions, and
- » the second – which is yet to come – based on expansion, esp. of services intensively using ICTs, accompanied by changes towards flexible labour markets, investment in human capital and ICT skills.

Surprising are the results proving that in Romania and in Russia the ICTs did not lead to convergence but to divergence. The authors draw also attention to the observation that the pace of labour productivity growth in new EU member states was so far higher in manufacturing than in services. They conclude that further convergence with the EU depends on, e.g., building modern institutions (with better regulations) and pursuing new policies (e.g. competition, innovation, education).

Krzysztof Piech attempts to verify if the relation between the development of knowledge economy and economic growth really exists. Basing on a sample of 102 countries, the World Bank Institute's measures of knowledge economy, correlation and regression methods, he comes up with a negative answer. It is contrary to the common belief as well as to e.g. the Lisbon strategy fundamental assumptions. Thus, he concludes that probably economists do not have proper measures of the knowledge economy or this notion is too broad to catch proper statistical relations.

Bartosz Witkowski follows this stream of research narrowing them to the R&D activity in CEE countries. Although the R&D-growth relations have been studied in various papers so far, he uses the sample of selected transition countries, which has not been well described yet. He quotes the studies showing that

in peripheral countries innovations indeed are the engines of growth.<sup>2</sup> After the theoretical introduction, the author tries to verify our present knowledge with the use of the new EU member states. Witkowski runs a correlation and multivariate analysis (based on Cobb-Douglass-type function). His final conclusion is that there is a relationship between business R&D expenditures and growth in the new EU member states but there is no evidence for existence of relations between governmental (and university-funded) R&D expenditures and the rate of growth.

The **second part** of the book is devoted mainly to the policy issues. The chapter by Jim Dratwa on policies for research and innovation (R&I) opens it arguing that relations between policies of particular countries and the EU as a whole are crucial for knowledge and innovation processes in Europe. He describes fragmentation of R&I system in Europe (e.g. of “knowledge and innovation” policies). Similarly to the author of the next chapter, Dratwa underlines the lack of research in the area of research, focusing on three areas of the European R&I system: vertical and horizontal policy coordination as well as the place of citizens. Dratwa quotes the ‘governance gap’, i.e. poor cooperation between different levels of authorities (EU, national and regional). It leads to problems with implementation of the Lisbon strategy: it is not enough to increase R&D expenditures (as it may lead to the increase of researchers’ salaries only) but it is necessary to coordinate policies (e.g. research, innovation, education ones), as it was indicated e.g. in the “Kok report”. What is more, there are problems with insufficient development of the theory of running public policies (which is mentioned by the next author as well). Moreover, even if we feel that policies towards knowledge economy are important for the EU development, in practice it is the Common Agricultural Policy, which is still heavily subsidised; it means that not only economics but also politics matters. Thus, the author once again calls for better policy coordination.

In further parts of the chapter, the author indicates that democratisation and the knowledge society are related and that science with technologies are at the heart of the democracy development. He also explains that creation of European Research Area is not about building some new bureaucracy but is aimed at better coordination of (fragmented) research systems and policies towards an increase of effectiveness of public money spending. The author concludes with a thesis: the Lisbon Strategy and its knowledge economy should be the key policy objectives; however, we do not have good enough measures of, e.g., knowledge economy or research policy improvement.

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<sup>2</sup> The author also draws attention to the results that not all innovation processes matter for growth, but only those financed from the private sources in non-peripheral countries; but in the peripheries – apart from the private research also research in higher education institutions have positive returns. Other results quoted by the author also bring mixed conclusions.

Tom Schuller deals with education research. He starts from stressing the importance of education in economic development. Then, he describes the research capacity building processes. He focuses on creation of agencies improving cooperation between research and policy-makers (and/or practitioners). The UK's EPPI Centre is indicated as a key example, but the author presents also the initiatives from New Zealand, the Netherlands and mentions the brokerage institutions from Denmark, Switzerland and the U.S. Schuller presents interesting indicators on educational R&D, which were worked out by OECD in Switzerland. Conclusions of the chapter starts from the observation that knowledge base of knowledge economies is very thin. Finally, the author proposes intensification of works on research on research systems.

The next chapter is a kind of answer for the call of two previous authors for intensification of the "research on research". The chapter by Henri Delanghe and Sandrijn Vanslebrouck is on a part of the European research policy. Its most important instruments are the framework programmes (FP), evolution of which is presented by the authors. They remind us about the weaknesses of the European research system, e.g. of insufficient funding and of fragmentation of research. In order to overcome the second problem, there have been introduced the collaborative research projects as well as the networks that emerged as a result. Consequently, the number of links between participants of the FP collaborative research projects increased from 40,000 in FP2 to over 180,000 in FP5. Moreover, although the research system and the research network across Europe is developing and the average participation in FPs per one unit (e.g. university) is about 2.8, there are 10 organisations which participated more than 100 times. Thus, we see that – as the authors argue – there has formed a core of participants, which solidified over time. They are usually the so-called 'knowledge leaders'. This group of 'oligarchic core' participants includes large research centres (e.g. CNRS, TNO), large industrial firms (e.g. Fiat, Siemens, DaimlerChrysler), and the best universities (e.g. Imperial College London, Oxford, Cambridge).

Karol Frank and Tomáš Jeck present innovation of Slovakia. They note that although recent years brought very high pace of economic growth in Slovakia, in the field of innovation and technology Slovakia ranks to the poorest performers in the EU. After presenting some innovation indicators, authors describe the innovation system in the Slovak Republic, both institutions and policy. As in some other new EU member states (e.g. Poland), Slovakia lacks both an institution responsible for innovation policy and the national innovation strategy. Thereafter, authors compare Slovakia with three other, small open economies, namely Finland, Ireland, and Estonia, presenting indicators and describing their innovation institutional framework. The chapter ends with recommendation for Slovakian policy-makers.

Ewa Okoń-Horodyńska's chapter is devoted to the foresight project in Poland (which she initiated while being the vice-minister of science) – the first and so far the only process of this kind in this country. The author begins from the description of foresight projects from the theoretical point of view. Then, she describes the National Foresight Program “Poland 2020”, launched in December 2006: its priorities, research fields (i.e. sustainable development, ICTs and safety), institutional framework, methodology etc. As a conclusion, the author calls for conducting regional foresights in Poland and inclusion of foresight researchers in creation of development strategies for the country, regions and corporations.

The **third part** of the book deals with diagnosing development of the Visegrad countries from the point of view of knowledge and innovation processes both on an inter-national and inter-regional (the cases of Slovakia and Poland) level.

The first chapter (by Anna Kadeřábková and Michal Beneš) discusses the issues of competitiveness of the Visegrad countries (comparing them to EU-25) from the point of view of different “knowledge” indicators. The authors used the Eurostat's structural indicators (referring them to the Lisbon agenda targets) and the data from the World Economic Forum. They also applied the methodology and data of the World Bank Institute, presenting the situation of V-4 countries compared to the group of four EU developed countries (Denmark, Finland, Sweden and the Netherlands). The authors conclude that the V-4 countries lag behind the EU-25 average (and also Slovenia and Estonia) in most of the structural indicators; they are characterised by, e.g., lower productivity, poor business-university cooperation, low number of science and technology graduates, low share of population with tertiary education. In these countries, the knowledge production and innovation performance is low; however, the high degree of openness to foreign investment (with technology transfer) seems promising.

The next chapter (by Zdenka Matouskova, Vera Czesana and Vera Havlickova) follows the overall shape of the previous one. It is concentrated on human resources indicators in the Visegrad countries (also from the point of view of structural indicators and the Lisbon agenda). The authors constructed the rank of V-4 countries based on five indicators, in order to compare the level of development of human capital. They conclude that Slovakia has the best comparative position in the overall quality of human capital among the V-4 countries.

Robert Guzik and Grzegorz Micek describe location of e-businesses in Poland. They did this through identification of location of ca. 5,700 e-commerce, web-design and web-hosting companies with the use of the location quotient analysis. The authors note the over-concentration of e-businesses in highly populated areas (esp. in major cities, apart from the city of Łódź). Particularly interesting is the case of Bielsko-Biała city, where the concentration of e-firms (per

10,000 inhabitants) was the highest in Poland. The major factor that lies behind the location of e-business in Poland was human capital and entrepreneurial activity (which seems to explain the exceptional case of Bielsko-Biała). Thus, although there is a vast literature emphasising the “squeeze of space” due to the ICTs, the authors prove that geography still matters. Moreover, the spatial differences between the locations of e-business in Poland depend on regional differentiation of human and entrepreneurial potential.

The last chapter in this part (by Štefan Reháč and Martin Sokol) presents regional development and policy in Slovakia, based on quite large set of literature. The authors identify two main weaknesses of the Slovak science system: small R&D intensity of the business sector and the domination of basic research (esp. in natural sciences) over applicable projects. Innovation development in Slovakia is mainly owed to Bratislava. Similarly to Poland, business R&D expenditures are rare. The authors underline the “growth paradox”: Slovakia’s fast development accompanied by falling R&D expenditures. There is no national innovation policy (there is the Slovak Lisbon Strategy, though) and even if there are regional innovation strategies, their impact on the regions is rather limited and geographically uneven. Thus, the authors advocate the EU’s more active role in promoting balanced regional development in new EU member states, esp. in cases when the solutions may be well beyond the possibilities of regions (or even nation-states).

The **fourth part** of the book deals mainly with industry level analyses. It starts from the chapter by Anna Kadeřábková and Martin Cicha who apply the concept of learning economy to the new EU member states. They continue their previous research (e.g. Kaderabkova, 2005) in the area of cost- and quality-based competitiveness, especially of the V-4 countries. They base their research mainly on Lundvall’s *et al.*’s (2006) methodology, use the data from the European Study on Working Conditions and from the Community Innovation Survey, applying, e.g., the factor analysis. Through their application, the authors identify four organisation clusters of workers and assess countries according to their most frequent appearance:

- » discretionary decision making (appearing mainly in Malta, Slovenia, and Poland),
- » lean production (Romania, Estonia and Latvia),
- » taylorist production (the Czech Republic, Hungary, Bulgaria), and
- » the traditional organisation cluster (Lithuania, the Czech Republic and Bulgaria).

The authors presented also alternative forms of work organisation according to industries, occupations and individual EU countries. Within the period 2000-05, the authors indicate Poland as the country (out of the V-4 group) where the organisational changes were the most favourable while the Czech Republic was the country of the most significant improvements towards competitiveness based

on quality and on internal sources of knowledge (in 2001-06). Other findings show that the strategic innovations appear only in organisations with discretionary decision making (typical for the Nordic countries) which in addition have the largest influence on the shift of companies towards the quality-based competitive advantage. Non-innovators are concentrated in organisations with Taylorist and lean production clusters.

David Dyker, who extended his research to a few distant transition countries like China or Kazakhstan, is the author of the next chapter. He describes industrial supply networks functioning in those countries and in the Central and Eastern Europe (CEE), providing the case studies for each of them. The chapter presents an in-depth study of industrial development based on networks. Dyker also confirms findings of the previous authors stating that geography matters and there is a need for the governments' clear visions towards clusters development. Basing on the example of China, the author explains why it was so difficult for CEE countries to develop first-tier suppliers. The reason for that is the lack of the cluster culture, based on trust and on exchange of knowledge and innovation. He expresses doubts if CEE countries' governments are able to think seriously about the long-term goals, while they direct large parts of the EU funds to satisfy sectoral and regional lobbies.

Similarly to Dyker, Anna Kadeřábková and Marek Rojíček also look at CEE countries from a broader perspective, including the globalisation processes (covering labour, FDIs, and services flows), e.g. China and India, and then focus on the Czech Republic. The authors remind us that the inflow of FDIs changed the value and structure of the Czech exports. Investments in automotive industries, which are of lower technology intensity, were growing most significantly. In addition, although the high-tech exports grow, the high-tech trade balance is still negative (improving, though). Moreover, despite the growing share of foreign companies in business R&D activities in the Czech Republic (about 50%), it concentrates mainly in manufacturing (not in services), and the share of value added in the knowledge-based activities still remains low, e.g. due to low R&D or innovation intensity of the value chain segments. The Czech Republic lacks human resources for research, linkages between business and academia, venture capital and higher quality of scientific and innovation output.

The **last part** of the book covers mostly company level, including the case studies, and is opened by Michał Górczyński's chapter. The author starts from observation that the level of innovativeness of Poland is low and then presents results of the questionnaire-based research (carried out annually) which was conducted in 2006 in 134 Polish largest companies. Then, he describes the results, mentioning, e.g., foreign companies in Poland conducting R&D activity using their own R&D departments (83%) or purchasing it abroad (12%) but not cooperating with domestic firms. Similar phenomenon takes place in Polish pri-

vate companies: only 3% of them cooperated with domestic R&D institutions. Only state-owned companies sector performed much better in this terms; as much as 42% of their R&D expenditures were directed to domestic R&D sector. The share of profits of Polish large, high-tech companies spent on R&D (2.5%) is five times lower than the EU companies (12.4%). In Poland, there is still a large share of R&D expenditures directed to low and very low R&D intensity activities (27%, while in the U.S. only 3% and 13% in the EU). The survey shows that the highest investment in R&D in Poland was in the chemical and software industries.

The authors of the next chapter (Piotr Niedzielski, Wojciech Downar, and Katarzyna Rychlik) deal with the maritime sector of North-Western part of Poland. According to its regional innovation strategy, this sector may be one of the most important drivers of innovation. The authors based their chapter on a case study of three most important maritime companies of the region (selected out of almost 800 entities) – a shipyard with its daughter-company (dealing with interior arrangements) and an administrator of two seaports, carried out with the use of interviews and questionnaires. The research shows that the three of them did not run any innovation policy (no procedures, documents, measures), although they seemed to have high innovative potential (partly due to the maritime cluster which is to be created in the region).

The last chapter of the book was written by Andrea Szalavetz. She investigates why knowledge-based companies are far different from average SMEs and provides a case study illustration to her theses: the case of Megatrend Zrt, the largest local enterprise resource systems (ERP) developer. The founders' background offers interesting insights into the characteristics of entrepreneurship in the final years of socialism. She tackles practical issues that emerge in the case of many high-growth, new technology based SMEs:

- » How can a firm that is highly successful in the private sector accommodate to public administration officials' different way of thinking, in order to be able to win public procurement tenders?
- » What is the role of networking and what sort of networks exist alongside to the knowledge-based ones?

The case may be an illustration of textbooks theses related to knowledge economy, high-tech entrepreneurship and networks (providing, among others, an example for the claim: "internationalize or die" as well as for the Gibb-Davies' classification of the explanatory factors of SME-growth and the findings of Radosevic, 2006).