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Institutional Underpinnings of the Development of Knowledge Sub-systems in Central and Eastern Europe[1]

Introduction

Knowledge sub-system is one of the key institutional domains that constitute each national economy (Jackson and Deeg 2012)[2]. Knowledge sub-system encompasses innovation, research and education (Kearney 2009; Farkas 2011). National systems of knowledge production cover a vast range of entities: *inter alia* universities, public institutes, R&D centers and think-tanks run by policy and civil society groups, industry and the private sector as well as the military complex (Kearney 2009). Over the last fifteen years the knowledge sub-systems have undergone profound transformation to emerge as the main motors of industrial competitiveness, growth and development in a globalized world (Amable 2003; Kearney 2009). Consequently, countries worldwide face increased demand to strengthen their capacities for knowledge production. This demand is rising across vastly different political, socio-economic and cultural contexts, each with their own capacity to respond.

The aim of this paper is to discuss institutional underpinnings of the development of knowledge sub-systems in CEE countries in comparison with Western institutional set-ups in the domain selected. Focus on international comparisons and understanding of political economy with regard to the complementarities between different sets of institutions are characteristic to the research field of *com-*

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[2] Jackson and Deeg (2012) identify six institutional domains, apart from the knowledge sub-system; the authors distinguish the following domains: finance, corporate governance and responsibility, industrial relations, industrial policy, and the welfare state.

parative capitalism (hence CC; for details, see Jackson and Deeg 2006; Edquist and Zabala 2012). The CC approach to national political economies underlines the need to understand the diversity and change (in particular, the long-term trajectory of institutional change) of institutions across countries (Jackson and Deeg 2008; 2012). Institutional diversity translates to distinct organizations of economic action that result in comparative institutional advantages for different forms of economic activity (Hall and Soskice 2001; Jackson and Deeg 2012). Institutional change is in turn perceived in the CC literature as a result of socio-political clashes (1) grounded in a complex distribution of power among different economic entities and (2) deeply rooted in path-dependent political legacies (Pierson 2000; Jackson and Deeg 2012). According to Jackson and Deeg (2012, p. 1109), "the analytical focus of the CC literature has recently shifted toward the attempts to document and explain institutional change in relation to European integration, liberalization and globalization" (changes introduced). This shift makes the institutional analysis of Central and Eastern European countries particularly welcome.

Thus far, the majority of studies on CEE countries have adopted a Western-centric perspective, stressing the convergence of CEE economies to Western models of democracy as well as wealth production and redistribution regimes (Bohle and Greskovits 2007; King 2007; Lane and Myant 2007; Nölke and Vliegenthart 2009; Cerami and Stubbs 2011). As Cerami and Stubbs (2011) note, the relevant literature on CEE countries has systematically overemphasized country-specific peculiarities (Hancké, Rhodes and Thatcher 2007; Lane and Myant 2007; Myant and Drahokoupil 2010), failing to sketch out any clear and conclusive categorization of key characteristics of the countries of the region (with a few notable exceptions, see e.g. Inglot 2008; Cerami and Stubbs 2011).

Adaptation of VoC (*Varieties of Capitalism*) approach to CEE countries resulted in the emergence (first) and competition (second) of provisional labels of economies in transition from socialism to capitalism. Just to name a few examples, Hancké, Rhodes and Thatcher (2007) defined some post-communist capitalisms as "emerging market economies" (EMEs), Nölke and Vliegenthart (2009) labelled the same CEE states as "dependent market economies". Bohle and Greskovits (2007), in turn, divided the CEE countries into three distinct clusters, i.e. "neo-liberal" (the Baltic countries), "embedded neo-liberal" (the Visegrad states) and "neo-corporatist" (Slovenia) economies. The division was based on the degree of proximity of the neo-liberal model. According to Jasiecki (2013) CEE capitalisms can be considered as premature hybrids of liberal, corporatist and Mediterranean elements, with a weak ability to innovate and a lack of state capacity to run a consistent macroeconomic policy.

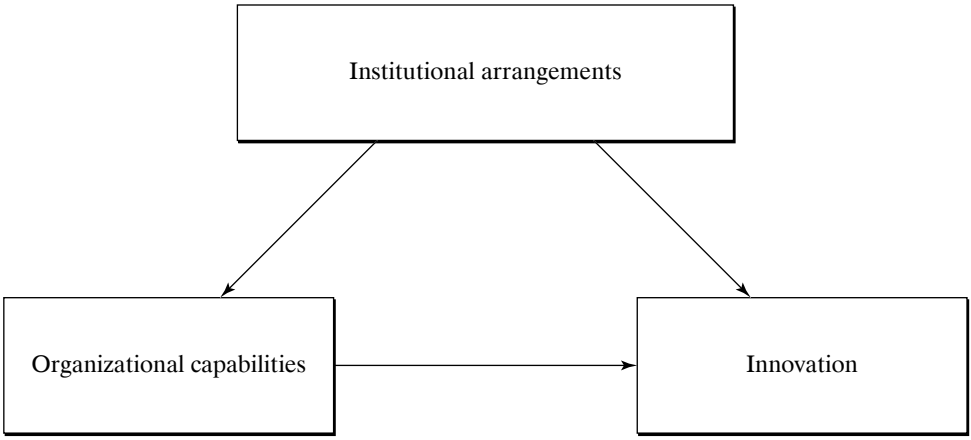
The remainder of the paper proceeds as follows. The next section links the VoC studies with the research on national innovation. Further, varieties of innovation and research as well as education in CEE economies are thoroughly examined and compared with Western institutional set-ups in the domain selected. The paper ends with a brief summary and conclusions.

1. Varieties of capitalism and national innovation

According to Edquist and Zabala (2012) the VoC approach has its main rationale in the fact that different institutional set-ups of economic systems are associated with different innovation capabilities and patterns of industrial dynamics. This reasoning is shared by Taylor (2004, p. 61; see also Edquist and Zabala 2012, p. 12) who believes that "variance in political institutions is the primary cause of differences in national innovative behavior". For Taylor (2004) coordinated market economies (CMEs) are particularly suitable for incremental innovation, whereas liberal market economies (LMEs) are breeding grounds for radical innovation[3]. Wojtyna (2005) claims that both CMEs and LMEs achieve comparable long-run results in terms of welfare, however the significant differences in innovation potential and income distribution can be observed. One may argue that if a particular economy has certain features that make it fall under the LME labeling, then more radically oriented (break-through) products should be expected out of that system. However, as Edquist and Zabala (2012) notice, the empirical evidence raised so far as to the relationship between the typology of VoC and its impact on the innovative performance of a national economy is not still robust enough.

Figure 1

Institutions and national innovation



Source: Edquist and Zabala, 2012 (modified).

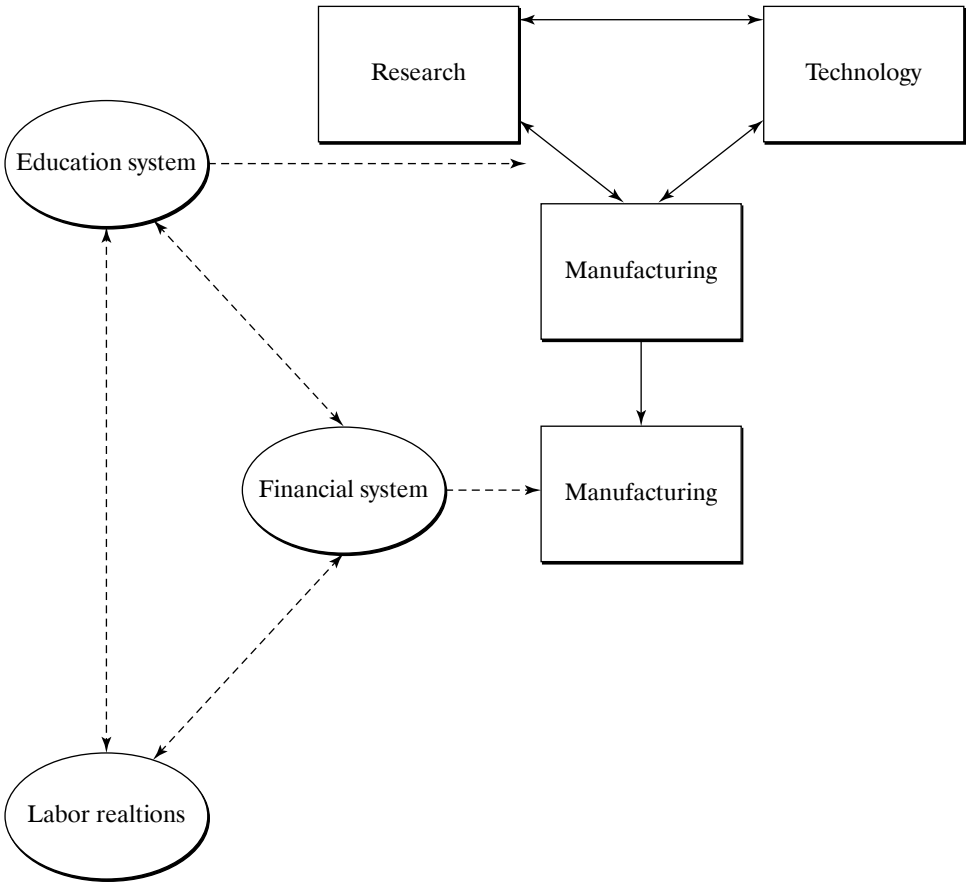
[3] It is unclear why the VoC framework considers only incremental and radical innovations in the national economies. There is a visible need to broaden the scope besides radical and incremental innovations (for elaboration, see Edquist and Zabala 2012). In fact, there are many economies that innovate by adaptation of the technologies developed elsewhere. What is more, innovation is not only a technological issue, but other forms of innovation are also introduced and diffused (e.g. think of organizational or marketing innovations).

For Hollingsworth (2000) institutional environment (institutional arrangements) in the national economy determines the set of available organizational capabilities that in turn to a high extent decide on the nature of national innovation (see Figure 1). Three domains indicated by Hollingsworth (2000) strongly correspond to the Williamson's framework of institutional analysis (Williamson 2000). The approach offered by Williamson (with some slight adaptations; for details, see Joskow 2008) identifies four interrelated levels of institutional analysis, i.e. (i) embeddedness (or social foundations), (ii) institutional environment, (iii) governance, and (iv) resource allocation. Embeddedness provides the basic foundations for a society's institutions, this level encompasses informal institutions, values and social norms and customs among others (Joskow 2008). Institutional environment encompasses what Williamson (2000) calls "the formal rules of the game". Both embeddedness (at least to some extent) and institutional environment level comprise Hollingsworth's institutional arrangements' domain. Governance encompasses what Williamson (2000) calls "the play of the game". The basic structural features and organization modes of the institutions through which decision-makers trade goods, services and production inputs are defined at this level (Joskow 2008). Governance level corresponds to Hollingsworth's organizational capabilities' domain. Resource allocation refers to the day-to-day operation of the economy given the institutions defined at the other three levels (qualities of goods and services, prices and wages, production costs and technologies are determined at this level; Joskow 2008). The majority of national innovation measures (both input and output measures) refer to the Williamson's resource allocation level.

Different set-ups of national economic institutions offer different opportunities to business firms, so that those firms adjust their production strategies as well as their use of different types of human capital to take advantage of these opportunities (Edquist and Zabala 2012). Hall and Soskice (2001) stress that firm strategies follow institutional structure of the national economy and thereby lead to different behavioral patterns of firms across diverse institutional settings (Jackson and Deeg 2006; Edquist and Zabala 2012).

As Amable (2003) shows, the basis of the VoC scheme is the dynamic interaction between the education and research sector (producer of ideas in the national economy), the technology sector which turns these ideas into commercial opportunities and the manufacturing sector which turns the commercial opportunities into marketable products (Edquist and Zabala 2012; see Figure 2). The education and research sector is responsible for supplying the economy with an adaptable and well-trained workforce and applicable knowledge. However, the education and research sector has to be properly supported by the national financial system which defines an implicit time horizon of innovation and plays an important role in selecting and financing investment projects and the national system of labor relations which indirectly determines price competitiveness as well as quality of cooperation in production relationships (Edquist and Zabala 2012).

Figure 2
VoC and national innovation



Source: Amable, 2003 (modified).

It is worth noticing that for some authors (see Gregersen and Johnson 1997; Taylor 2004; Edquist and Zabala 2012) the state in the VoC framework should not be perceived passively (as is often the case), but rather as a "dynamizer" or "catalyzer" of innovation activities in the economy. Government bodies can play roles as active economic agents. Taylor (2004, p. 628; see also Edquist and Zabala 2012, p. 16) states bluntly that "while the firm may be the key actor in capitalist economies, and the primary producer of goods and services, it is difficult to ignore the role of the state in innovation as strongly as VoC's theory and classification systems do".

As we have already seen, the VoC literature is based on the analysis of why institutions are likely to influence the performance of economies and why this could be expected to have consequences for the scientific, technological, and industrial specialization as well as on innovation capabilities (Amable 2003). It is meaning-

ful that in Amablian concept innovation considerations are encountered both in the analysis of one of the five institutional domains (education domain) and as the ultimate goal of the social system (social system of innovation and production, hence SSIP), i.e. the ability to adapt and innovate (Amable *et al*. 1997).

Cooke (2001) instead of SSIP coined the term "industrial innovation and learning system" (IILS) in order to show commonalities between VoC approach and "the new economy innovation system" concept (Edquist and Zabala 2012). According to Asheim and Herstad (2005) while the traditional national innovation system (Lundvall 1992; Okoń-Horodyńska 1998) is based on the existence of positive synergies between the national production structure and the knowledge infrastructure, "the new economy innovation system" is based on the local *ad hoc* relationships between market demand, venture capitalists and incubators. What is more, the traditional national innovation system is usually accompanied by the institutional framework of a CME (long-term and stable structures of insider ownership and finance, cooperative inter-firm relations and a dedicated labor force), whereas "the new economy innovation system" carries the characteristics of the institutional framework of a LME (fluid, professionalized or bureaucratized labor markets and shareholder value-oriented system of corporate governance and control; see Edquist and Zabala 2012).

Edquist and Zabala (2012) link the VoC approach to the concept of knowledge-intensive entrepreneurship systems (KIES) which are based on the strength of the incentives given to agents and their ability to respond to them: individuals invest in education and training expecting high returns from a competitive labor market which enables a large wage dispersion according to demand for skills and financial-markets-based system favors setting up new technological ventures (Amable 2003). Edquist and Zabala (2012) add to the traditional VoC approach next five dimensions to grasp the dynamic capabilities of KIES. These dimensions are: relevance of trust, policy-mix between formal and informal institutions, measurement of national performance, dynamics of institutional change, multi-level perspective.

The importance of trust increases enormously in the learning economy. For Edquist and Zabala (2012) both formal and informal institutions are costly to establish and reproduce, so societies where norms of honesty, trust and mutual responsibility are accepted may be better off than those requiring policing. Next, in the extended VoC approach not only formal institutions, but also informal aspects should be included. In other words, a difference should be made between the role played by "hard" (e.g. laws) and "soft" institutions such as trust or beliefs. Edquist and Zabala (2012) consider that both formal and informal institutions play a major role in explaining the differences to be observed in the innovation performance of particular economies. The same authors suggest that increasing attention should be given to overall macroeconomic performance and its link to national innovation (the complementary measures such as growth rate, unemployment rate, welfare state measures, share of new firms, sales of new products, R&D measures, sector maturity indicators, types of firms or firm

size should be widely used). One of the strongest claims made to the VoC approach is related to its static character. Therefore Edquist and Zabala (2012) support the views of Streeck and Thelen (2005) and Rafiqui (2010) as to the need to follow a historical analysis to look into the evolution of capitalist varieties. Finally, according to Edquist and Zabala (2012) countries, sectors, training systems or individuals all have different profiles which not only vary among countries but also among themselves. Thus, this constitutes the motivation to strive for a multilevel approach to VoC studies where different sets of measures can be applied at different levels of analysis (sector, region, country) so that the conclusions obtained at one level complement those at a different level (Edquist and Zabala 2012).

In Europe it is widely recognized that the relations and synergies between innovation, research and education are the main drivers of the global knowledge economy (Veugelers and Mrak 2009). European policy-makers understood that: (1) progress in innovation, research and education has to be looked for in a synchronized way: lack of progress in one area can hinder advances in the other two; (2) attention must be paid to the links between the three areas: lack of proper links between the elements of the system can render advances in a single domain ineffective[4].

The efficient knowledge sub-system comprises innovation, research and education activities (Farkas 2011; Kearney 2009). The components of knowledge sub-systems (with special emphasis on CEE countries) are thoroughly examined in the next sections.

2. Innovation and research

As is shown in previous sections, there have been several attempts to compare the CEE economies with existing capitalist models, but these comparisons either include only a few countries or use a more limited list of features than the VoC literature does with reference to older capitalist states (see e.g. Estrin *et al*. 2007; Farkas 2013). These studies compare the CEE countries with the Mediterranean countries or the Continental states, or even with the Coordinated Market Economies. Other works identify the features of the Anglo-Saxon or the Liberal model

[4] The idea of interrelatedness between innovation, research and education is supported by *innovation ecosystems approach* (Jackson 2011). Innovation ecosystem, consisting of several innovation agents, i.e. researchers, capitalists, entrepreneurs, government representatives and society as well as innovation drivers, such as education, infrastructures and culture, utilizes all indicated elements which constitute functional characteristics that specifically regulate change or maintain the desired systems stability (Soriano and Mulatero 2009; Jackson 2011). According to Soriano and Mulatero (2009, p. 4) "focusing only on some [elements] fails to yield the desired results and if one of them is dysfunctional, it can impair all the others". Under this framework, innovation process is self-reinforcing: entrepreneurial success entices other business firms and more capitalists, thus creating a virtuous circle (Soriano and Mulatero 2009).

in some CEE economies (e.g. Buchen 2007; King 2007; Knell and Srholec 2007; Mykhnenko 2007; Csaba 2009; Farkas 2013).

None of the cited studies conducted a detailed empirical analysis that compares the institutional arrangements of the old member states (OMS) and the CEE countries. The notable exception is the empirical article written by Beáta Farkas (2011). She examined six socio-economic sectors: product markets, labor markets, financial systems, social protection systems, education as well as R&D and innovation, using 112 indicators (data were sourced from Eurostat, the European Central Bank, the European Innovation Scoreboard, the World Bank, the Fraser Institute, and the UNCTAD).

When analyzing the field of R&D and innovation, Farkas (2011) examined not only expenditure measures and available human resources' measures but also the level of employment in high-technology industries and knowledge-intensive services as well as the export of high-tech products and licensed patents.

Cluster analysis allowed to identify four distinct groups of countries. Cluster 1 – the leading European innovators – consists of Finland, Sweden and Germany (Farkas 2011). In these countries the private sector is generating two-thirds of the high-level expenditures on research and development. This characteristic is accompanied by the high employment levels in high-tech businesses and knowledge-intensive services. What is more, these countries are characterized by the highest numbers of patents per capita.

Luxembourg constitutes a separate cluster (Farkas 2011). Within a moderate level of R&D expenditures in total, the industry plays the dominant role in research and innovation financing. The export ratio of high-tech products is high, while knowledge-intensive services are at an average level.

Ireland and the UK constitute the third cluster (Farkas 2011). Typical characteristics of this group are moderate levels of R&D expenditures and significant role of the private sector in research and innovation financing. However, this ratio is not as high as in the previous clusters. Moreover, the number of patents per capita is much smaller than in the most prominent innovating countries. The export of high-tech products is at a high level, as is the ratio of employees in the knowledge-intensive services.

A relatively low level of R&D expenditures is a typical characteristic of the fourth cluster consisting of post-communist and Mediterranean countries (Farkas 2011). In terms of research and innovation financing, government investment rates reach 50%. This means that the role of the private sector is relatively weak. The ratio of patents in cluster 4 countries is extremely low, even compared with the previous group of countries. The activities of multinational enterprises explain the smaller gap in the presence of high technologies compared with the other three clusters.

According to Nölke and Vliegenthart (2009) in CEE economies decisions regarding research and development are not dominated by concerns about the long-term innovation potential of national economies, but rather by their current profitability. The similar claim can be also found in the Polish literature (cf. e.g. Gardawski 2014;

Kozak 2014). Moreover, the organization of the innovation system within CEE economies differs considerably from those within LMEs (where innovations are transferred through the market mechanisms) and CMEs (where innovations are spread by means of industrial cooperation). In the case of CEE economies, most R&D activity is done outside the region and then imported into the production process through transnational networks that bind together the different places of production (Nölke and Vliegenthart 2009). Modern technologies are transferred to CEE economies under the strict control of transnational corporations. For Nölke and Vliegenthart (2009) as well as Högselius (2003) innovation in CEE countries is predominantly imitative and not creative. Technological activities in firms are skewed towards downstream nonanalytical and non-R&D activities like testing or standards. According to Leszczyński (2015) the CEE countries managed to develop rather complex export structures; however, these countries have only played a secondary role in global production markets and networks and lack the sophisticated business infrastructure needed to develop a high-tech innovation capacity (e.g. access to venture and private equity capital, established large domestic enterprises in high-tech industries or strong R&D bases) (see also Maszczyk and Rapacki 2012).

Due to state control, in socialist countries the interfirm relations characteristic for Western economies did not exist. R&D was centrally conducted by planning authorities which also decided in which sectors which technology for which production should be used (Kornai 1992; Buchen 2004). After removal of the planning system firms had to find ways how to cooperate. However, for example in Estonia, no significant attempts to cooperate "beyond the market" were made (following VoC this is not even possible due to lack of encompassing business organizations). Firms had to build up completely new relationships with new business partners following the breakdown of firms and markets in CEE, so it is not surprising that in these economies trust within industry is not yet well developed (Czaban *et al*. 2003; Buchen 2004).

3. Education

When turning to education and training systems, CEE economies can be distinguished from the European countries that manifest the LME or CME varieties of capitalism (Nölke and Vliegenthart 2009). The late 1990s saw substantial cutbacks in government spendings on education and a decentralization of the responsibility for education in CEE states. At the same time the basics of the socialist education system, with its focus on vocational training, survived but its orientation radically changed. As Roberts (2001) points out, one of the key features of the postsocialist education system is that vocational training is structured mostly to meet the labor demands of transnational corporations (Nölke and Vliegenthart 2009).

Farkas (2011) underlines that participation at different levels of education and its level of financing provide a lot of useful information on the position and role of educational sector in the national economy. The abovementioned indicators are then matched with unemployment and employment data relating to the respective education levels (Farkas 2011). The results of cluster analysis for the field of education in European countries are presented below.

A typical characteristic of the first group is the relatively high employment rate of social groups with different educational levels, along with a high ratio of school enrolment. Austria, Denmark, Finland, the Netherlands, Sweden, the UK and the "neocorporatist" Slovenia (the only country from the CEE region) belong to this group. The ratio of early school-leavers and of people who completed only lower secondary education is below the average for all members of this group but is not the lowest. The participation level of adults in life-long learning programs is exceptionally high. The number of students enrolled in higher education and having completed technical or natural science studies is the highest of all groups. Expenditures on education are the highest in this group. Almost all indicators of unemployment and employment are the most favorable for all education levels in this group of countries. The employment rate in the low-skilled social groups is also well above average, but this level is exceeded by the data for the second cluster.

Italy, Spain and Portugal constitute the second cluster (Farkas 2011). The ratio of attendance in higher education in those countries is above European average but this goes with an extremely high ratio of low-skilled people. The employment rate in the highly-skilled social group is the worst. Adult participation in education and training is low. Education expenditures are below average.

Belgium, the three Baltic countries (Latvia, Estonia and Lithuania), France, Greece, Hungary, Ireland, Luxembourg and Romania belong to the third cluster (Farkas 2011). The ratios of low-skilled social groups and of highly-skilled persons are around average. However, the number of students enrolled in the vocational system and in adult education is lower than the European average. Education expenditures are below average, except for Belgium, France and Hungary, where education expenditures are clearly above average. Employment rates stay close to or just below average for all educational levels. Unemployment rates are around average, except for those of the low-skilled social groups which are distinctly lower.

The fourth group consists of Bulgaria, the Czech Republic, Germany, Poland and Slovakia (Farkas 2011). The ratio of low-skilled people is the lowest in this cluster, as is that of early school-leavers. The highest ratio is among pupils participating in at least upper secondary education and vocational training. Participants in adult education and in technical or natural science majors represent the lowest ratio of all four clusters. Public expenditures on education are the lowest but private expenditures are the highest compared to GDP. Employment and unemployment rates in the low-skilled social groups are the least favorable. According to Farkas (2011) Germany fell into this group of economies probably because of the reunification of the country.

Farkas (2011; 2013) concludes that CEE states exhibit the greatest similarities with continental educational systems. Slovenia was the only one to fall into the group of – mainly Nordic – countries with the most successful educational systems.

For Nölke and Vliegenthart (2009), in CEE economies public vocational training takes place largely outside of corporations. For example, in Hungary a rapid shift of training provision from employers (business firms) to vocational schools occurred during the Hungarian transformation from socialism to capitalism (Nölke and Horn 2014). The substitution of employer-provided with school-provided training has resulted in higher unemployment and lower job quality, particularly upon leaving school. Results from statistical analyses run by Nölke and Horn (2014) indicate that the shift in training provision from employers (business firms) to schools between 1994 and 2000 has raised the unemployment rate of male vocational school graduates by 10 percentage points within the first two years after graduation.

What is more, as Bohle and Greskovits (2007) note, CEE governments find it difficult to invest heavily in public education given the fiscal constraints that go together with the fierce competition for FDI.

Andersen and Werfhorst (2010) observed the empirical differences in occupational returns to education between CEE countries and non-CEE countries. These differences are substantial, with education tending to have a much stronger effect in the CEE countries. The advantage of vocational qualifications relative to incomplete secondary education is less than half the size in CEE countries to that in Western European countries. However, a tertiary degree leads to even greater advantage in CEE countries than it does in the countries of Western Europe (Andersen and Werfhorst 2010).

In Buchen's (2004) view, in socialism vocational training was practically the same in all CEE countries: large state-controlled enterprises cooperated with state-run technical schools. This led to firm-specific and industry-specific skill formation. Along with the collapse of numerous state-owned enterprises (SOEs) at the beginning of transition, technical schools lost the opportunity to train pupils appropriately (Roberts 2001; Buchen 2004). Consequently a new way of vocational training had to be found, though institutional legacies of the past limited the range of possibilities and options in institutional innovation (Hausner *et al*. 1995).

For example, in Estonia the inherited Soviet-style training scheme was retained until 1998 (Buchen 2004). Then curricula of high schools and vocational schools were brought closer to each other. The aim was to prepare pupils to solve more general problems which could be applied broadly. This brought a fundamental change to the system of education and vocational training (the shift towards an emphasis on general skills was made). In contrast, in Slovenia, the old system was put on a new basis by introducing a dual system of apprenticeships, very much like the German scheme (Buchen 2004). Apprentices started to be trained both at business firms and in vocational schools, thereby acquiring both firm-specific and industry-specific skills (Geržina *et al*. 2000; Buchen 2004). The development of company-specific skills is typical in the large and most advanced

Slovenian firms. This is consistent with VoC arguments about the generation of cospecific assets in CMEs (Crowley and Stanojević 2011). Simply put, while Estonia abandoned the old system and thereby obviously moved into direction of an LME, Slovenia successfully tried to keep up the old system.

Summary and conclusions

This paper has briefly explored the knowledge sub-systems as parts of main political economy models and welfare regime typologies that have emerged in transition countries of Central and Eastern Europe. Although there are not many studies devoted explicitly to the entrepreneurial and innovation propensities of different VoC, the links between diverse models of capitalism and national innovation systems were here successfully identified and carefully examined (see section 2).

Institutional environment (institutional arrangements) in the national economy determines the set of available organizational capabilities that in turn to high extent decide on the nature of national innovation. As Amable (2003) shows, the basis of the VoC scheme is the dynamic interaction between the education and research sector (producer of ideas in the national economy), the technology sector which turns these ideas into commercial opportunities and the manufacturing sector which turns the commercial opportunities into marketable products (Edquist and Zabala 2012).

The VoC literature is based on the analysis of why institutions are likely to influence the performance of economies and why this could be expected to have consequences for the scientific, technological, and industrial specialization as well as innovation capabilities (Amable 2003).

Later, it should be stressed that most of the research pertaining to the VoC strand (see e.g. Hall and Soskice 2001; Amable 2003) has concentrated on prevailing models of capitalism in Western economies and has not comprised transition countries. Even though a number of studies have dealt with transition economies or the "post-communist capitalism", they tended to be narrow in scope (Knell and Srholec 2007; Mykhnenko 2007). If we suppose that institutions in the CEE countries are not moving towards any of the existing capitalist models, then it is logical to ask what development possibilities the Central and Eastern European model can bring (Farkas 2011).

The policy conclusions are so far quite ambivalent. The most immediate implication would be for the CEE economies to substantially invest in education, training and research in order to stabilize their current comparative advantages against the relocation of production and to attract new investments (Nölke and Vliegenthart 2009). Thus far, a relatively low level of R&D expenditures is a typical characteristic of CEE countries (Farkas 2011). In terms of research and innovation financing, government investment rates reach 50%. This means that the

role of the private sector is relatively weak. The ratio of patents in CEE countries is extremely low. The activities of multinational enterprises explain the smaller gap in the presence of high technologies compared with the other European economies (Farkas 2011; 2013). In terms of education there are no clear patterns for CEE countries. Some new member states show similarities with continental education systems. Slovenia was the only one to fall into the group of mainly Nordic countries with the most successful educational system (Farkas 2011).

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INSTYTUCJONALNE FUNDAMENTY ROZWOJU PODSYSTEMÓW WIEDZY W EUROPIE ŚRODKOWEJ I WSCHODNIEJ

Streszczenie

Podsystem wiedzy obejmujący innowacje, badania naukowe oraz kształcenie jest jednym z kluczowych obszarów instytucjonalnych, które współtworzą każdą gospodarkę narodową. W ostatnich 15 latach podsystemy wiedzy uległy głębokiej transformacji i stały się głównymi motorami konkurencyjności gałęzi przemysłowych, wzrostu oraz rozwoju gospodarczego w zglobalizowanym świecie. Niniejszy artykuł dokonuje gruntownego przeglądu obszernego piśmiennictwa poświęconego problematyce podsystemów wiedzy w krajach Europy Środkowo-Wschodniej. Wynikające z przeglądu wnioski dla polityki gospodarczej są jak dotąd ambiwalentne. Najbardziej bezpośrednią implikacją dla polityki gospodarczej krajów regionu wydaje się potrzeba znacznego zainwestowania w kształcenie, szkolenia zasobu pracy oraz badania naukowe w celu ustabilizowania bieżących przewag komparatywnych krajów Europy Środkowo-Wschodniej na tle globalnych procesów realokacji produkcji oraz w celu przyciągnięcia nowych inwestycji. Jak dotąd, stosunkowo niski poziom wydatków na badania i rozwój pozostaje typową cechą dla krajów Europy Środkowo-Wschodniej. Liczba patentów przypadających na jednego mieszkańca w krajach Europy Środkowo-Wschodniej jest bardzo niska. Działania podejmowane przez przedsiębiorstwa transnarodowe tłumaczą relatywnie mniejszą lukę do pozostałych gospodarek europejskich w zakresie obecności w regionie wysokich technologii. Pod względem kształcenia nie istnieją wyraźne wzorce dzielone przez kraje Europy Środkowej i Wschodniej. Niektóre kraje regionu wykazują podobieństwa z kontynentalnym systemem kształcenia. Słowenia natomiast pozostaje jedynym krajem regionu przypominającym systemem edukacji odnoszący sukcesy model nordycki.

Słowa kluczowe: wiedza, innowacje, badania naukowe, kształcenie, Europa Środkowo-Wschodnia

JEL: I2, O3, P5

INSTITUTIONAL UNDERPINNINGS OF THE DEVELOPMENT OF KNOWLEDGE SUB-SYSTEMS IN CENTRAL AND EASTERN EUROPE

Summary

Knowledge sub-system encompassing innovation, research and education is one of the key institutional domains that constitute each national economy. Over the last fifteen years the knowledge sub-systems have undergone profound transformation to emerge as the main motors of industrial competitiveness, growth and development in a globalized world. This paper thoroughly reviews the large body of literature on knowledge sub-systems in CEE countries. The resulting policy conclusions are so far ambivalent. The most immediate implication would be for the CEE economies to substantially invest in education, training and research in order to stabilize their current comparative advantages and to attract new investments. Thus far, a relatively low level of R&D expenditures is a typical characteristic of CEE countries. The ratio of patents to population numbers in CEE

countries is extremely low. The activities of multinational enterprises tend to diminish the gap in the presence of high technologies compared with Western Europe. In terms of education there are no clear patterns for CEE countries. Some states show similarities with continental education systems. Slovenia was the only one to fall into the group of – mainly Nordic – countries with the most successful educational system.

Key words: knowledge, innovation, research, education, Central and Eastern Europe

JEL: I2, O3, P5

ИНСТИТУЦИОНАЛЬНЫЕ ОСНОВЫ РАЗВИТИЯ ПОДСИСТЕМ ЗНАНИЙ В ЦЕНТРАЛЬНОЙ И ВОСТОЧНОЙ ЕВРОПЕ

Резюме

Подсистема знаний, охватывающая инновации, научные исследования и обучение, является одной из ключевых институциональных сфер, из которых состоит любая национальная экономика. На протяжении последних пятнадцати лет подсистемы знаний подверглись глубокой трансформации и стали главными двигателями конкурентоспособности промышленных отраслей, роста и экономического развития в глобализованном мире. Статья дает углубленный обзор многочисленной литературы, посвященной проблематике подсистем знаний в странах Центральной и Восточной Европы (ЦВЕ). Вытекающие из этого обзора выводы имеют двойственный характер. Самым непосредственным выводом для экономической политики стран региона кажется необходимость проведения значительных инвестиций в образование, обучение трудовых ресурсов и научные исследования с целью стабилизации текущих компаративных преимуществ этих стран и привлечения новых инвестиций. Относительно низкий уровень расходов на исследования и развитие продолжает оставаться типичной чертой стран ЦВЕ. Количество патентов на душу населения в этих странах очень мало. Деятельность транснациональных предприятий помогает сократить разрыв, имеющийся по отношению к остальным европейским странам с точки зрения насыщенности экономики высокими технологиями. Системы образования в странах ЦВЕ опираются на различные образцы. Некоторые страны этого региона строят свою систему образования по европейской модели, а, например, Словения много заимствует у успешной скандинавской модели.

Ключевые слова: знания, инновации, научные исследования, образование, Центральная и Восточная Европа

JEL: I2, O3, P5