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Universities and Knowledge Production in central Europe

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Introduction

In the knowledge economy, knowledge has become the crucial source of added value (Stehr, 2002: 17). Definitions of the knowledge economy abound. As Foray puts it:

> by knowledge-based economies I mean, essentially, economies in which the proportion of knowledge-intensive jobs is high, the economic weight of information sectors is a determining factor, and the share of intangible capital is greater than that of tangible capital in the overall stock of real capital. (Foray, 2006: ix; see also Leydesdorff, 2006 and Stehr, 1994)

There seem to be no fundamental differences between understandings of the concept of the knowledge economy in social sciences and in international organisations. As the World Bank defined it recently,

> A knowledge economy is one in which knowledge assets are deliberately accorded more importance than capital and labor assets, and where the quantity and sophistication of the knowledge pervading economic and societal activities reaches very high levels. (World Bank, 2007: 14; see also OECD, 1996)

This chapter explores the question of knowledge production in four central European economies, all OECD members (Poland, Hungary, the Czech Republic and the Slovak Republic) in the context of the knowledge economy, economic competitiveness and research intensity.[1] I argue that, today, they are not

1 The paper focuses on 'central Europe' rather than on (more traditional in social sciences and economics) 'central and eastern Europe': although for almost two decades, central and eastern Europe (CEE) was the major political, economic, social and geographic point of reference in research into postcommunist transition countries, the countries in question have become too diverse today to analyse them under a single label.

'knowledge economies' in the ways that their more affluent and technologically advanced western European counterparts are. Therefore, one of the themes of this chapter is an examination of an ongoing east/west divide in knowledge production resulting from a high path-dependency for the economy, as well as for higher education and research and development systems in the region. I also argue that the communist legacy in central European countries matters substantially: it matters for their economies, in transition to market economies; it matters for their societies, in transition to what are sometimes termed 'postcommunist welfare states'; and it matters for both educational and research and innovation systems crucial for knowledge production. The three areas (economies, societies and higher education and research systems) are interlinked and an assessment of knowledge production requires an analysis of their interrelations.

How deep is the divide between knowledge production in central Europe and in major western European economies? To what extent is the divide today driven by hard (difficult to change in the medium run) factors, and to what extent by soft factors (more easily changeable)? The former factors include levels of public funding in higher education and research systems, the social and age structures of the workforce, the structure of employment by major economic sectors and the overall national levels of economic competitiveness. The latter, soft, factors include funding and governance modes in higher education and research systems, access policies in higher education and the matching of education systems with labour market needs, as well the majority of factors related to business, legal and institutional environments – as, for instance, reported annually by the World Bank via the 'ease of doing business' indicators (World Bank, 2010).

Both hard and soft factors link the patterns of ongoing knowledge production in the region to the communist and post-communist legacies. Social and economic change takes time and, from a current perspective, the two decades of transformation (1990–2010) are not enough to bridge the gap between the east and the west in knowledge production. Universities in central Europe are changing, sometimes rapidly but most often gradually, but western European universities have been changing even more rapidly in the last 20 years, as comparative studies indicate (see Shattock, 2008; Bonaccorsi and Daraio, 2007; Maassen and Olsen, 2007). It has been noted of the region (and this viewpoint easily fits the case of higher education) that 'social transformation, including the adoption of a new value system and social behavioral pattern, is not a process of one or two decades. It takes generations. Based on the economic and political transformation, gradual social adjustment may follow. History, however, remains part of the present for a long time' (Berend, 2007: 279).

Universities in central Europe are struggling to remain in the outer layers of the dramatically changing global academic centre. Without thoughtful higher education and research policies, combined with radically increased research support and new funding modes, they might move from the outer layers of the

centre to the global academic periphery. The processes in question can be most clearly observed through the analysis of trends over time in various global competitiveness indexes and in European and global university rankings. What is especially revealing are the trends over time in those pillars of economic competitiveness (such as the annually reported *Global Competitiveness Index*), which refer directly to higher education, research and innovation systems and trends in the four central European economies under discussion.

In particular, central European academics and policy-makers should no longer believe in three interrelated myths, still popular in the region. First, the myth that post-communist universities, due to their history, are exceptional in Europe and their exceptionality should be preserved. In fact, their exceptionality lies in being systematically inward-looking and academically driven institutions, isolated from concerns of both society and the economy. Secondly, the myth that post-communist universities as public sector institutions are radically different from all other public sector institutions, and immune from the impact of global and European public sector reforms. And, thirdly, the myth that knowledge production can increase in reformed (in both funding and governance modes) higher education systems, even with current low public expenditures on research and development. These three myths have been powerful inhibitors to knowledge production in the region and have been shared throughout the two decades of transition by academics and policy-makers.

Knowledge Production and Historical Legacies

Knowledge production in central Europe is strongly linked to the legacies of operating for fifty years in command-driven communist economies, and to wider post-communist transition processes in the last 20 years. The historical legacies relevant to knowledge production in the region include the following parameters: economy and society (rather than merely politics), public services (social policies, leading to the 'emerging' welfare states, as opposed to 'established' welfare states (Castles *et al.*, 2010)), higher education policies (including especially governance and funding reforms) and research and innovation policies (especially those related to academic entrepreneurialism and university–enterprise partnerships).

The Fiscal Context: Communist and Transition Periods

The fiscal context in which knowledge is produced in universities and in which universities operate in central Europe is of critical importance for the present discussion. In post-communist central Europe, there has been a continuing conflict between the need for high-quality higher education and fiscal constraints, especially in the 1990s when higher education systems were undergoing the first wave of reform (see for details, Cunning *et al.*, 2007: 29).

Central European countries in general have similar funding modes for financing public higher education: financial aid to students is combined with the avoidance of charging them tuition fees. A dual-track system is prevalent in the region: fee-free higher education is available for regular students, disproportionately coming from socially and economically privileged families (only Poland being an 'equity success story', with decreasing inequality in access to higher education (Kwiek 2008c)) admitted via competitive entrance exams, and a special fee-paying track available for those who fail to gain admission – which tends to 'penalise students from disadvantaged families' (Cunning *et al.*, 2007: 29) and which raises serious equity concerns.

The research mission (as well as the third mission), in general, has been systematically denigrated throughout the region for almost two decades, despite differences between the four countries, related to various attempts at reforming governance and funding patterns, especially in the 2000s – the Polish reforms of 2008–2011 being an interesting example of introducing 'new rules of the game', (Kwiek and Maassen, 2011). Drastic public underfunding of universities in the 1990s led both academic institutions and individual academics to apply various survival strategies, related mostly to introducing fee-based university programmes for part-time students in public universities and teaching in private higher education institutions by academics from public institutions. (On the two types of privatisation, see Kwiek, 2010, and on the emergent public–private dynamics in higher education, Kwiek, 2011). The survival strategies have led to research underperformance: both institutions and academics alike were focusing on teaching.

But does almost half a century of operating under the communist regime and two decades under transition conditions explain sufficiently the current differences in overall research performance levels of higher education systems in central Europe and in EU-15 economies? What is the long-term impact of communism on different academic culture(s) in central European countries, including different governance and funding regimes and the lack of academic freedom and institutional autonomy? What is the impact of what Elster *et al.* (1998: 158) (with reference to economies) called 'the long arm of the past' in the area of knowledge production? As stressed by analysts of social policy generally, much more attention is currently paid by academics to the legacies of the past and the ways in which these legacies 'influence meaningful change' today (Inglot, 2005: 5).

There were three major effects of the post-1989 transition, all relevant for trajectories of transformations of higher education systems: the distribution of income and earnings widened; output fell and tax revenues fell even more sharply; and job security ended (Barr, 2001: 242–243). In the 1990s, the relatively stable social and economic environment in which knowledge was produced in communist-period universities was disintegrating. New institutional norms and behaviours emerged, together with institutional autonomy and academic

freedom, regained immediately following the collapse of communism. But autonomy was accompanied by severe financial constraints: long-term, systemic financial austerity was the trademark of university knowledge production in the region throughout the 1990s, and its impact on higher education systems, institutions and individual academics has been substantial (Kwiek, 2011).

The Social Context: Communist and Transition Periods

Communist-era higher education and research systems and their knowledge production in central Europe differed substantially from their western European counterparts. They were a centralised higher education systems, with attempts at balancing the number of graduates with the number of jobs, and with educational credentials more important in job allocation than actual knowledge or skills; curriculum guidelines, research goals and requirements for filling teaching positions were defined and closely monitored by the Communist Party; a unitary system of traditional university education was provided, with no bachelors programmes; and the financing of universities was entirely dependent on the government (Mateju, *et al.*, 2007: 374–375).

All these points are no longer valid, but the removal of their legacy is what happened, at various speeds, during the past 20 years, through different reform programmes. The current shape of universities and knowledge production in central Europe is determined by specific factors defining both the communist and post-communist transition periods (as is the case with social policies – see Tomka, 2005).

It would be unfair to deny the large extent to which central European universities have been transformed in the last two decades. But knowledge production in the region cannot escape its recent history: after being viewed as strategic elements of communist regimes, universities in the first decade of the transition period were largely left on their own, autonomous but severely underfunded, and engaged much more in (mostly fee-based) teaching than in traditional knowledge production. Their recent history matters, especially in three areas: slow (and generally limited) governance and funding reforms; academic institutional culture that accepts the denigration of research missions; and underfunding of research in higher education.

Competing Social Narratives about Universities in the Region

From a historical perspective, universities in central Europe, Poland included, are not able to produce convincing social and institutional narratives in defence of their traditional roles in society – as their historical rootedness either reaches too far back into the past (i.e. is too explicitly Humboldtian) or is too idiosyncratic and 'tainted' by the period of communism. In both cases, their historical rootedness, and resulting narratives linking their past to their future, are viewed

by central European policy-makers and the media as possibly interesting but largely irrelevant for current and future challenges.

In the absence of convincing narratives about universities produced by universities themselves, new narratives are increasingly produced by the state, especially governments involved in reform programmes. Not surprisingly, in these new narratives (for instance, the 2005–2008 and 2008–2010 narratives about the need for reforms in Poland), universities are viewed as 'instruments for national political agendas' rather than as 'institutions', to use Olsen's distinction (Maassen and Olsen 2007). Universities seem unable to protect both their institutional identities and their institutional integrity, unable to produce and promote a common, socially convincing narrative about the social, cultural and economic future of academic institutions. Institutions without powerful founding ideas at their disposal are much more easily subject to radical reform programmes, which is the Polish case of 2008–2011.

What seems to matter for the strength of the instrumental view of the university, prevalent in the region, is the relatively weak rootedness of traditional organisational and funding patterns. Both the communist period and the two decades of post-communist transformations have not been strong enough, or legitimate enough, reference points for the production of convincing narratives based on the vision of the university as a community of scholars. Consequently, universities in the region – if, as in Poland, exposed to the pressures of comprehensive instrumental reform – seem much weaker partners in a stakeholders' dialogue about their future than universities in western Europe.

And the consequences for university knowledge production are manifold: first, in the absence of powerful, socially accepted narratives linking universities' pasts, presents and futures, governance and funding reforms in the last two decades were much less substantial than they should have been and were often merely cosmetic. Public interest in universities focused on their increasing teaching capacities, and increasing enrolment rates, combined with policy fascination (although often not without disgust) with the newly created and socially illegitimate private higher education sector in the region. The identity crisis of the academic profession, caused, *inter alia*, by institutional underfunding and low academic salaries, led to a decade of weak, cosmetic reforms and lost the interest of the public in universities as knowledge-generating institutions and, consequently, the interest of policy-makers in the university research mission.

In the early years of the transition period, both domestic and, especially, international policy actors were paying little attention to social policy in general (setting up unemployment systems was the only area of priority concern at that time): neoliberal policy-makers focused on stabilisation, liberalisation and privatisation policies (Orenstein and Haas, 2005: 145ff). The neoliberal so-called Washington Consensus 'had little to say on the social-sector restructuring that was to become such a large part of post-communist transformation' (Orenstein

2008: 85). The process of reforming social policies in central Europe during the post-communist era turned out to be 'much longer and much more difficult than most experts anticipated' (Inglot 2005: 3). Nevertheless, a 'surprisingly long distance from the Soviet Bloc to the European Union' was covered in a 'historically extremely short period of time' (Berend 2007: 269). The general lack of reformers' focus on higher education, and the fascination of both the public and policy-makers with the single indicator of student numbers, had far-reaching consequences for knowledge production: the teaching mission became the core mission.

Most prominent political figures and their advisers involved in Polish economic reforms of the early- and mid-1990s (notably Leszek Balcerowicz and Jeffrey Sachs) hardly mentioned the need for reform of teaching and research. Poland was not an exception: the lack of higher education reforms was prevalent in central Europe, perhaps partly owing to western views that communist educational systems did not need substantial transformations, in contrast to economic and political systems. It needs to be added, by way of justification, though, that the 1990s in the region meant creating 'the very fundamentals of capitalism': not surprisingly, 'in eastern Europe, both markets and private enterprises were virtually non-existent for about 40 years' (Elster *et al.*, 1998: 157). It is perhaps only from a safe distance of almost two decades of 'transition' and 'accession' that we can criticise the missing dimension of higher education reforms in central Europe in the 1990s and stress its role in the ongoing east/west divide in knowledge production.

The East/West Divide Continues

The different roles of universities in knowledge production in more affluent OECD countries and in central Europe can be viewed in terms of these four characteristics:

1 The structure and levels of research funding. The share of university (and government) R&D funding in central Europe is much higher than the share of enterprise R&D funding in the national picture, compared with the OECD average. And the levels of R&D funding, both public and private, are considerably lower (gross domestic expenditure on R&D activity, or GERD, for Poland was 0.59 per cent of GDP in 2009). At the same time, the structure and levels of higher education funding (usually as a separate funding stream from research funding) are broadly similar. Knowledge production is located mostly in the public sector; while in the OECD as a whole, about 70 per cent of R&D funding is concentrated in the business sector, for Poland (and central European members of OECD) it is only 30 per cent (2009). Different structures and substantially lower levels of research funding have powerful negative impacts on knowledge production; as a recent EC report put it

explicitly, research systems in new EU member states may not deserve to be designated as 'research systems' at all (EC, 2009: 40).

2 An institutional focus on teaching-related revenues rather than research-related revenues in public universities in the region, as a consequence of very low public funding for research. Teaching-related revenues mean mostly fees from part-time students: this is a specific feature of central European higher education systems – full-time students studying without fees and part-time students paying fees. There is almost full dependence on fees in the private higher education sector and, consequently, the research mission there is marginal. The role of private higher education in the four countries, and in post-communist countries generally, is exceptional on a European scale (the only exception in western Europe being Portugal).

3 Low levels of engagement in academic entrepreneurialism and weak university–enterprises partnerships. Academic entrepreneurialism is mostly generated by research (and third-mission) activities, although some teaching activities may be viewed as entrepreneurial (Shattock and Temple 2006). In central Europe, though, there are only islands of entrepreneurialism located in public universities. The level of university–enterprise partnerships is generally low for structural reasons common throughout the region and related to university governance modes and levels and modes of university research funding.

4 The continuing absence of central European universities in global (and especially European) university rankings. In 2010, only five universities from the region were present in the *Academic Ranking of World Universities*: one in the third hundred (Charles University in Prague, the Czech Republic, in the range 201–300) and four in the fourth hundred (Warsaw University and the Jagiellonian University in Poland, Eotvos Lorand University and the University of Szeged in Hungary, in the range 301–400). No university from the Slovak Republic (or from Romania or Bulgaria) was ranked in top 500 world universities. No university in central Europe is located in the top 100 world universities either in subjects (like chemistry) or fields (like social sciences). The ranking is dominated by American universities: in the top ten, there are only two European universities (Cambridge ranked fifth and Oxford ranked tenth), and in the top 20 there is only one more non-American university, the University of Tokyo (ranked twentieth).

Knowledge Production in Central Europe and Economic Competitiveness

Is there a central European variant of the knowledge production model, related to a possible central European variant of the knowledge economy? Probably both can be discerned, both being historically related (path-dependent) to communism and its central planning. Thus, post-communist universities, regional knowledge production, the emergent socio-economic model ('post-communist

welfare state'), and a regional variant of the knowledge economy seem to be strongly interrelated concepts.

Generally, in a world in which the economic dimension is viewed by policy-makers as increasingly important in assessing countries in general and their higher education systems in particular (compared with more traditional social dimensions), rankings of economic competitiveness based *inter alia* on assessments of higher education and research and innovation systems cannot be ignored. Especially, they should not be ignored in post-communist countries still aggressively seeking foreign direct investments. Both national economies and universities themselves are increasingly ranked and assessed according to standardised global measures. Universities are increasingly constructed as organisations rather than as institutions – what Ramirez called their 'rationalization' (Ramirez 2006, see Brunsson and Sahlin-Andersson 2000). As Meyer *et al.* stress, the modern university in a globalised and rationalised world is a 'purposive actor':

> In this world of imagined homogeneity, standardised dimensions of ranking, certification, and accreditation make sense. Universities around the world can be compared and rated on standard scales. And if they are effectively and purposively managed organizations, perhaps they can improve their rankings *vis-à-vis* all the other universities in the world. (Meyer *et al.*, 2007: 206).

The discussion of central European knowledge production in this section refers only to two global indexes: the Global Competitiveness Index (*The Global Competitiveness Report 2010–2011*) and *Doing Business 2010*.[2] The major point is that economic competitiveness is not supported by higher education and innovation 'pillars' in central European countries to the same extent as it is in affluent OECD economies. Central European economies, compared with major European economies, still severely lag behind in most of the other ten pillars; these lags relate to structural features and will be difficult to overcome. At the same time, expectations of both governments and the general public in the region of higher education and public R&D and innovation systems regarding economic competitiveness are very high; we view them here as exaggerated, due to numerous other factors exogenous to the two systems, and related to the other ten pillars of competitiveness.[3]

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2 It could also be accompanied by references to other indexes, such as, especially, IMD *World Competitiveness Scoreboard 2010*, BCI *Business Competitiveness Index 2009–2010, The Lisbon Review 2010: Towards a More Competitive Europe*, as well as the World Bank *Knowledge Economy Score Board 2009* for central European countries – but the overall results regarding knowledge production would not be much different.

3 The other ten pillars of competitiveness include institutions, infrastructure, macroeconomy, goods market efficiency, labour market efficiency, financial market sophistication, technological readiness, market size, business sophistication and, last but not least and of interest to us here, innovation. They are often interdependent and try to reinforce each other (Porter *et al.*, 2008: 3–6).

An almost automatic passage from (high) levels of individuals' earnings premia in higher education to (high) levels of economic growth of countries based on the strength of their (higher) education systems is often taken for granted. Central European economies have still the highest wage premia from higher education in the OECD area (they have been for a decade in the top five countries), while their knowledge production is relatively low and their economic competitiveness is modest. I argue here that for central Europe, the other ten 'pillars of competitiveness' are of critical importance, and without progress in the other pillars, the higher education and innovation pillars lose the fundamental role they have in western European economies. It is difficult for higher education and innovation systems to go beyond their national social and economic contexts: they belong to national legal and infrastructural settings and are regulated by national arrangements, are funded from national taxes, and produce graduates with skills necessary for national economies. The national settings are, for higher education and innovation systems, both burdens and challenges (see Arbo and Benneworth 2007).

The four central European countries discussed here are among the top six OECD countries with the highest increase in the number of students in higher education between 1995 and 2004, with the first three places belonging to Poland, Hungary and the Czech Republic (OECD 2008a: 30). But the massification of higher education in central Europe took place in a specific context. As Nicholas Barr stressed, in EU accession countries governments were caught between conflicting imperatives:

> the constraints of the Stability and Growth Pact, and the demands of other parts of the public sector – unemployment benefits, active labour market policies, poverty relief, and policies to address social exclusion, pensions, healthcare, and school education. The resources to finance mass, high-quality higher education from taxation were simply not there. (Barr, 2005: 243)

One of the implications is that the numerical expansion of higher education occurred mostly in cheap-to-run programmes, with a strong fee-based (rather than tax-based) private sector, wherever relevant, with a strong negative correlation with the quality of education – as in the Polish case. Polish universities shifted their institutional attention away from joint research and teaching missions to teaching missions, as fees guaranteed an additional income stream – and now, refocusing attention back to research and teaching missions, after almost 20 years of neglect, is difficult to achieve. Internationally visible knowledge production requires transformations of institutional cultures towards substantially more entrepreneurial, innovative and competitive ones and, perhaps most of all, changes in funding and governance structures.

Two Pillars of Competitiveness: Higher Education and Innovation

Let me follow here the notion of economic competitiveness developed by Michael Porter and used in annual *Global Competitiveness Reports* (Porter *et al.*, 2008; Schwab 2010). Macroeconomic, political, legal and social circumstances underpin a successful economy – but are not in themselves sufficient: 'wealth is actually created in an economy at the microeconomic level – in the ability of firms to create valuable goods and services using efficient methods. Only firms can create wealth, not government or other societal institutions' (Porter *et al.*, 2008; 2008: 53). So, on this view, economic competitiveness and productivity depend ultimately on the microeconomic capability of the economy.

Knowledge production in central Europe is viewed in this section in the context of different types of economic competitiveness. As nations develop, their competitive advantages move from the factor-driven stage (low-cost labour, natural resources) to the investment-driven stage (foreign technology, imitation) to the highest one – the innovation-driven stage (innovative products and services at the global technology frontier). Only one central European member of the OECD studied in this paper – the Czech Republic – is driven by the same type of competitiveness as the most affluent OECD countries. But Poland, the Slovak Republic and Hungary (as well as Latvia, Lithuania, Estonia and Romania) are in a transition stage. The role of higher education is different in each of the three stages and economic growth is faced with different competitiveness challenges in each of them.

Of the 12 pillars of competitiveness (Schwab, 2010), two are of special interest: 'higher education and training' and 'innovation'. While most major OECD economies are ranked in the first two deciles of the index, the four central European countries are in the fourth, fifth and sixth deciles of it (Czech Republic is ranked 36, Poland ranked 39, the Slovak Republic ranked 60, and Hungary ranked 52). The four central European countries are relatively well ranked in terms of tertiary enrollments (Hungary ranked 23, Poland 21, Czech Republic 32 and Slovak Republic 40) and relatively weakly ranked in terms of both the university–industry collaboration in R&D (the Czech Republic ranked 29, Hungary 32, Poland 64 and Slovak Republic 87) and extent of staff training (the Czech Republic ranked 40, Poland ranked 52, Slovak Republic ranked 75 and Hungary ranked 88).

Let me focus on Poland, the Slovak Republic and Hungary (and two other newer EU member states, non-OECD members Romania and Bulgaria), considerably less competitive economies than the Czech Republic. Where are the weak and the strong points in their tertiary education and training pillar and in their innovation pillar?

Table 11.1 Ranks by indicators of the 'higher education and training' section

Indicators	*Poland*	*Hungary*	*Czech Republic*	*Slovak Republic*	*Bulgaria*	*Romania*
Secondary education enrolment rate	25	33	42	50	66	54
Tertiary education enrolment rate	21	23	32	40	46	22
Quality of the educational system	62	75	34	111	85	84
Quality of maths/ science education	40	30	25	65	69	43
Quality of management schools	62	71	56	114	94	98
Internet access in schools	48	31	24	35	45	55
Research and training services	22	47	17	41	80	95
Extent of staff training	52	88	40	75	135	72

Source: Schwab, 2010: 111–299.

Overall, Hungary is ranked high in the higher education and innovation pillars (34 and 41, respectively), while Poland is ranked high in the higher education pillar and low in the innovation pillar (26 and 54, respectively). The Slovak Republic is ranked low in both pillars (53 and 85, respectively). The strong points for both Poland and Hungary in the higher education and training pillar are tertiary enrolments; strong points for Hungary and Poland are the quality of mathematics and science education; internet access in schools is strong in Hungary; and the quality of the educational system is ranked low for Poland and dramatically low for both Hungary and Slovak Republic. In the sub-indices for innovation, the central European economies rank low (about 40–50) or dramatically low (about 70–80).

Table 11.2 Ranks by indicators of the 'innovation' section

Indicators	*Poland*	*Hungary*	*Czech Republic*	*Slovak Republic*	*Bulgaria*	*Romania*
Capacity for innovation	50	46	24	69	79	72
Quality of scientific research institutions	47	18	21	90	73	83
Company spending on R&D	61	75	25	68	96	103
university–industry collaboration in R&D	64	32	29	87	110	103
Gov't procurement of advanced tech products	61	106	31	127	87	105
Availability of scientists and engineers	60	48	50	71	77	55
Utility patents per million population	54	32	34	44	31	62

Source: Schwab, 2010: 111–299

I want to stress that the central European economies are not globally competitive, not only because they lag behind in the higher education and innovation pillars of economic competitiveness but also because they lag behind in the other pillars. Consequently, even much more modernised higher education and innovation systems would not be decisive in improving their economies' competitiveness. There is a wide, although slowly bridged, east/west gap related to a multitude of factors, from tax systems to legal systems to transportation infrastructure. Knowledge production in the region cannot and should not be assessed in isolation from its economic environment.

Knowledge Production and its Regulatory Environment

Knowledge production in universities and in business occurs in regulatory environments that cannot be easily avoided by either universities or companies. In universities, it is funding and governance regimes that matter most, whereas in the business sector it is often 'ease of doing business' that is crucial. To show the differences between major OECD economies and the four central European countries, let me refer to the 'ease of doing business' ranking (at the

microeconomic level of companies), annually measured by the World Bank in the last five years, most recently in *Doing Business 2011: Making a Difference for Entrepreneurs* (World Bank 2010).

There are ten categories in which the comparative advantages of countries are analysed: starting a business, dealing with construction permits, employing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a business. Central European countries are scattered along the ranks, with Slovak Republic and Hungary in the forties (ranked 41 and 46), followed by Poland and the Czech Republic almost in the middle of the ranks (70 and 63) (World Bank, 2010: 4). Top OECD economies are in the 30 ranks, with Singapore, Hong Kong (China), New Zealand, the UK and the USA in the first five places. These are the regulatory realities in which central European economies are operating, which go far beyond education and innovation systems but, at the same time, directly influence both national economic competitiveness and processes of knowledge production in the business sector. These realities also directly or indirectly influence two other areas where knowledge production occurs: the area of academic entrepreneurialism and the area of university–enterprise partnerships, as recent research tends to show (Shattock, 2008, Mora *et al.,* 2010).

What are the advantages of the Slovak Republic and Hungary over Poland and the Czech Republic? Poland's weaknesses are clear: out of 183 countries, it has low rankings in such categories as starting a business (rank 113), dealing with construction permits (rank 164) and paying taxes (rank 121). The Czech Republic is ranked over 100 in two categories: starting a business (rank 130) and paying taxes (rank 128). And, not surprisingly, all four central European countries are ranked around 120 in a single category – paying taxes – with between 257 and 557 hours spent on average on dealing with taxes per year (World Bank, 2010: 159–193).

What is important in our context of central European knowledge production is that higher education and innovation systems in western Europe function in very competitive economies, and that companies, including the companies involved in R&D and innovation, operate in relatively friendly legal and regulatory environments. This brings us back to two ideas: first, expectations from higher education (and innovation) systems should not be exaggerated in globally less competitive economies, as opposed to economies in which all other components of competitiveness are in place; and, second, the roles of higher education (and innovation) systems in central Europe and western Europe differ strongly, due to a multitude of factors exogenous to higher education systems.

The necessary (and measurable) need of 'catching up with the west' in such areas as infrastructure, technology or business sophistication may be viewed as more important, and consequently public funding may be directed more easily towards these areas than towards higher education. And, assessing the level of public funding for university research in almost all new EU member states, this

is exactly what has been the case in the last two decades. Aghion and Howitt (2009: 312) have recently claimed that, generally, the closer a country is to the productivity frontier, the more urgent it becomes to invest in higher education to foster innovation; and therefore in the US, growth will be enhanced by investing more in research institutions rather than in two-year colleges. Central European countries are not at the productivity frontier, and so, on this basis, a case can be made for investment in areas other than university research.

Table 11.3 Ranks of countries in the World Bank's ranking of favouring business regulations in 183 economies by the *Doing Business* indicators

Indicators	*Poland*	*Hungary*	*Czech Republic*	*Slovak Republic*	*Bulgaria*	*Romania*
Ease of doing business	70	46	63	41	51	56
Starting a business	113	35	130	68	43	44
Dealing with construction permits	164	86	76	56	119	84
Registering property	86	41	47	9	62	92
Getting credit	15	32	46	15	6	15
Protecting investors	44	120	93	109	44	44
Paying taxes	121	109	128	122	85	151
Trading across borders	49	73	62	102	108	47
Enforcing contracts	77	22	78	71	87	54
Closing a business	81	62	32	33	83	102

Source: World Bank 2010: 159–193

The Geography of Knowledge Production in Europe: Regions

Apart from countries as units of analysis in knowledge production, in recent years regions in European countries (referred to as NUTS 2 level) have increasingly become the focus of attention of both researchers and policy-makers (see EC 2009; Hanell and Neubauer, 2006, Arbo and Benneworth, 2007, Goddard, 2000, OECD, 2007). A report on *Europe's Regional Research Systems: Current Trends and Structures* published by the European Commission presents a new typology of regions, which is relevant for the assessment of knowledge production in central Europe.

There are six leading regional R&D performers in Europe – three regions in Germany and one each in The Netherlands, Finland and Sweden. All other regions in the EU are classified into four types. Type 1 regions are R&D-driven regions, with a high research publishing and patenting intensity, and a business sector contributing an above-average share to regional GERD. Type 2 regions are public-sector-centered, R&D supported regions, with a high research publishing intensity in contrast to an only slightly above-average patenting intensity, and where gross expenditures for R&D are slightly above average, mostly accounted for by either universities or public research institutions. Type 3 regions are broadly based, R&D-supported regions, with an average research publishing and patenting intensity; but are not home to outstanding centres of excellence in either the public sector or in business research. And finally, Type 4 regions comprise the remaining regions in which R&D plays a small role (EC, 2009: 40).

With an exception of merely two regions (the Praha region in the Czech Republic and the *Bratislavsky kraj* region in the Slovak Republic), all regions in central Europe (as well as, presumably, in Romania and Bulgaria, for which data are not available in a comparable format) are classified as either Type 3 or Type 4 regions, the vast majority of them being classified as Type 4 regions. Central European regions are weakest in research intensity and the least research-driven in the European Union.

A number of countries – including the four in central Europe studied here – consist of Type 3 and Type 4 regions only (with the two above exceptions). The EC report concludes: 'it is likely that within their national context they lack sources of knowledge to which an enlarged European Research Area network could provide access' (EC 2009: 44). A report on *Geographies of Knowledge Production in Europe* published by NORDREGIO stresses in its conclusions 'a clear core-periphery pattern' in the structure of knowledge intensity in Europe. 'The East-West divide in Europe' – the theme of the present paper – is 'still clearly discernable' (Hanell and Neubauer 2006: 28). Consequently, knowledge production in central Europe, at a regional level, is performed in regions that are not R&D-driven: in the vast majority of regions, R&D plays a supportive role or is merely complementary to the local economy.

Conclusions

A fair assessment of knowledge production in the region needs to refer back to historical legacies of the communist system and to two decades of its post-communist transformations. Universities in central Europe for half a century were operating under special circumstances, with far-reaching consequences for the transition period and beyond. The early 1990s brought about rapid political and economic transformations, while in the next ten years the reform packages included also welfare policies and higher education policies. Despite the powerful role of European policy agendas in transforming higher education

systems in the region in the 2000s, both prior to and following EU accession in 2004, central European higher education still struggles with communist and post-communist legacies. Consequently, social narratives, or founding ideas, about the roles of universities in society and in the economy, produced by universities themselves, are relatively weak – as opposed to strong narratives increasingly produced by policy-makers involved in comprehensive reform programmes, as the Polish example indicates.

The east/west divide in knowledge production continues, as testified by assessments of both higher education and innovation systems. On economic grounds, both pillars of economic competitiveness related to higher education (higher education and training, and innovation) are weak, as are both research and patenting outputs in the region. The role of factors other than higher education and innovation systems is substantially more important for competitiveness and growth in central Europe than in affluent western economies. The international visibility of universities as knowledge production centres in the region is extremely low, with just a few of them present in either global or European university rankings. The analysis of the geography of knowledge production at the level of regions may indicate that central Europe is in danger of being effectively cut off from the emerging European Research Area. The very idea of knowledge economies may be far more difficult to apply in the region than is generally accepted in OECD and EC discourse.

The east/west differences in higher education systems and in university knowledge production may be bigger than expected, and the role of historical legacies may be more long-term than generally assumed in both social scientific and public policy studies on the region. Transformations of universities may take much longer and the gradual convergence of both higher education and research systems in the two parts of Europe cannot be taken for granted without thoughtful changes in both university funding (including both its modes and its levels) and university governance. Central European universities desperately struggle to remain in the global academic centre but their gradual decline to the academic periphery cannot be excluded unless proper measures are taken. The issues of European integration in higher education and research, on the one hand, and of revised national policies in central Europe in these two areas, on the other, must be at the top of the agenda.

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