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## **Regional Engagement of Mid-Range Universities: Adapting European Models and Best Practices in Hungary**

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# Regional Engagement of Mid-Range Universities: Adapting European Models and Best Practices in Hungary

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**ABSTRACT:** The focus of our article is on the role of mid-range (mid-size) universities in the development of peripheral regions in the context of the university engagement literature. After summarizing the literature on the contribution of universities to regional development, the article looks through the most important theoretical considerations including the developmental role (the third mission) of universities. It presents the main issues in which the mid-range universities in peripheral regions are different from the top universities located mainly in metropolitan areas. Using case studies from Central and Eastern Europe, the article concludes that not only the position of universities in the collaboration with business sector but their role in the innovation system is quite different, and there is a need for much more comprehensive and complex economic policies initiating the support of the university sector and starting the development of high-tech industries, small-scale enterprises, and constructing a regional advantage with stronger community involvement of universities.

In many regions, universities are viewed as the core of the knowledge base, acting as key elements of innovation systems, supporting science and innovation-based regional growth (Huggins & Kitagawa, 2009). The so-called regional engagement of universities has been developed through an evolutionary

process during the last 50 years. Traditionally, universities primarily focused on teaching and, to some extent, research, while university education was elite education. In many European countries, due to the gradual expansion of the higher education sector, the appearance of mass education and lifelong learning, and the declining share of grants provided by the state in the 1970s and 1980s, competition between the universities has become stronger, and they have been forced to perform their research activities on a profit-oriented basis. Universities have had to seek alternative sources of funding from business, industry, civil society, and non-national state actors (Harloe & Perry, 2004). Also, public funding became increasingly competitive funding, and research activities often require public-private partnership. This is called the “entrepreneurial turn,” or the servicing mission of universities (Inman & Schuetze, 2010; Tjeldvoll, 1997) or the “Mode 2 university” (Harloe & Perry, 2004). In this context, “Mode 1” refers to the traditional way of knowledge generation, which is anchored in disciplines and is more homogenous and hierarchical. This is also referred to as the ivory tower model of universities. In contrast, “Mode 2” refers to the application-oriented, transdisciplinary, and reflexive way of knowledge generation (generative role of universities) in the context of the entrepreneurial university (Chatterton & Goddard, 2000; Clark, 1998). “Mode 2” is also characterized by heterogeneity and organizational diversity, social accountability, and quality control.

Later, in addition to teaching and research, universities started to adapt a third mission or developmental role, which can be described as “community service” mainly by the U.S. literature, and “regional engagement” in Europe (Holland, 2001), “regional innovation organisation” or “academic entrepreneurialism” (OECD, 1999).

The university engagement literature, while accepting that universities may well undertake knowledge generative activities, proposes that they adopt a broader, developmental focus on adapting their core functions of teaching and research, as well as community service, to address regional needs (Chatterton & Goddard, 2000; OECD, 1999). In regard to human capital formation, the university engagement literature focuses on the importance of regionally focused teaching (Chatterton & Goddard, 2000), which is manifested in a stronger focus on regional student recruitment and graduate retention; the development of programs that address skills required by regional industries, particularly small and medium-sized enterprises; and the localization of learning processes, for example, through workplace-based learning and regional projects.

This third (developmental) mission is a somewhat indefinite concept that refers to the economic development role motivated by the social responsibility of the institutions. According to Harloe and Perry (2004), the third role of universities in relation to sub-national (EU regions) economies and societies has been widely justified in terms of the development of the knowledge

economy and the significance of the regions in economic development. This “regionalization of the economy” strengthens the links between the universities and the clusters of firms and regionally based supply chains of small and medium-sized firms (Gunasekara, 2004). Knowledge and innovation have become increasingly important sources of economic development, and there is a pressure from government, businesses, and communities for universities to align their core functions with regional needs (Chatterton & Goddard, 2000).

Huggins and Kitagawa (2009) argue that although universities emphasize their international orientation, they are embedded in their region and add to the area’s economic and social strength through, for example, preserving local jobs, diversifying the local economy, and attracting investors. Among many others, these authors state that economic development and the welfare of regions can be enhanced through universities’ various engagement with the local economy, including research, infrastructure development, education, effective industry-university partnerships, technological innovation, and community development.

In this article we try to adapt the models of universities’ regional engagement in the case of a peripheral border region in Central and Eastern Europe, the South Transdanubia Region in Hungary. Although the study applies the concept of mid-range university to Central and Eastern Europe, the term of mid-ranged universities was borrowed from the study by Wright, Clarysse, Lockett, and Knockaert (2008), which is focused on mid-range universities and their links with industry in British, Belgian, German, and Swedish regions. In the United Kingdom for example, mid-range universities are defined as all universities except top universities and new (post-1992) universities. For example, the sample of Wright et al. (2008) included universities teaching between 8,000 and 33,000 students and employing between 700 and 2,500 full-time researchers. However, in the United Kingdom and other European countries there are many first-ranked universities located in non-metropolitan regions, which is not the case in Central and Eastern Europe. As the consequence of a spatial concentration of top universities in Central and Eastern European countries almost exclusively in metropolitan areas, mid-range universities are most often located in non-metropolitan regions (Gál and Ptáček, 2011).

In our article we examine to what extent regional, mid-range universities may enhance economic development in a lagging area and to what extent European models of the universities’ third role may be relevant in this particular region. Our hypothesis is that universities’ developmental role is much weaker in peripheral regions where mostly mid-range universities are present, and the traditional models designed for first-ranked universities located in prosperous economic environments are not directly applicable due to, for example, the different sectoral structure of the economy and the different nature of the knowledge supply and demand.

Our article is structured as follows. In the next section, we briefly summarize the results of the literature concerning the economic impact of the universities and the methods of the quantitative measurement. Then, we present the relevant theoretical considerations of the developmental role of universities including the traditional theories, the triple helix model and its variants, and the regional engagement literature. The next section focuses on the specificities of the mid-range, peripheral universities, which have similar characteristics to those of the South Transdanubia. Then case studies are presented from the region that may reveal the position of the universities in the system of regional and cross-border development. Finally, some concluding considerations are included in the last section.

### **KNOWLEDGE-BASED REGIONAL DEVELOPMENT: THE ECONOMIC IMPACT OF UNIVERSITIES**

Universities are often viewed as the engine of regional development (Florida, 1999). However, we cannot think of this relation as a linear one in which university research results in technological innovation that generates regional development. For example, Florida (1999) emphasizes that the regional economic system needs to have eligible absorptive capacity, which is the ability of a region to absorb the science, technology, and innovation that universities generate. This means that the presence of a high-quality university is only a necessary but not sufficient condition for regional economic development, since regions need to capture the spillovers of the knowledge they generate. This notion appears—among others—also in the article of Huggins and Johnston (2009), who conclude that while universities can play an important role in economic growth, they are often supported by a dense system of institutions, including publicly funded research institutes and laboratories engaged in applied research. In contrast, most of the least competitive regions have no such established research infrastructure and absorptive capacity.

Among many others, Drucker and Goldstein (2007) distinguish several ways in which universities and other higher education institutions potentially contribute to regional economic development, including knowledge creation, human capital creation, transfer of existing know-how, technological innovation, capital investment, provision of regional leadership, knowledge infrastructure production, and influence on regional milieu.

Regional economic impacts may appear in the form of, for example, productivity gains in private enterprises, increased tax revenues, direct and indirect effects of university spending, creation of new firms, increases in regional creativity and the capacity to sustain long-term development and growth (Drucker & Goldstein, 2007).

Many of the quantitative evaluations indicated a significant, positive economic impact, while others are more tentative about their results (Goldstein & Renault, 2004; Lawton Smith, 2007), or at least treat them with caution (Mueller, 2006) and highlight the need for a differentiating approach (Huggins & Johnston, 2009; Wright et al., 2008). There are several ways to quantitatively assess the economic impact of universities upon their region. Most of the works in the literature use regional input-output models, growth accounting, and multiplier estimation. They focus on either university spending, investment, or employment effects. Quantitatively, specific outcomes of the universities can be spin-off firms, university-industry linkages, patents and licensing agreements, student migration or additional earnings. For example, Huggins and Johnston (2009) calculate universities' value added, which is— analogously to the firms' value added—calculated by adding together surplus, employee costs, and depreciation. This allows them to compare universities according to their wealth-generating capacities and to estimate a measure of the labor productivity of universities by calculating the value added generated per full-time-equivalent employee. Garrido-Yserte and Gallo-Rivera (2010) employed a quantitative approach in which they classified the economic impacts into two groups: the supply-side (human capital and research-related) effects and the demand-side (expenditure and multiplier-related) effects, and focused on the latter.

Using a quasi-experimental approach, Goldstein and Renault (2004) found that research universities, per se, do not contribute significantly to regional economic development or regional earnings, but the condition to achieve this is that universities undertake direct economic development activities. They concluded that universities' research and technology development activities generate significant knowledge spillovers that are captured within the regional environment, and result in enhanced regional economic development. Yet, the magnitude of the contribution that universities' research and technology development play is small compared with other factors.

In sum, universities definitely have a positive impact upon their regions; however, the extent of this impact has to be assessed realistically without generalizations.

## THEORIES OF THE UNIVERSITIES' DEVELOPMENTAL ROLE

The theoretical approaches are based on the idea that knowledge and innovation have become increasingly important sources of national economic differentiation and, since innovation processes are interactive, *they* require collaboration between actors in different spheres (Srinivas & Viljamaa, 2008). The literature distinguishes two main theoretical models: the triple helix model (which is recently augmented to the quadruple helix) and the regional engagement model.

### *The Triple Helix Model*

The traditional model of universities' impacts on their regions is the linear trajectory in which universities create knowledge for the local community, and if the industry has eligible absorptive capacity, the knowledge will generate economic growth (Goddard & Chatterton, 2003). The triple helix model (Etzkowitz & Leydesdorff, 1997) describes a co-evolutionary, interactive relationship instead of a linear one and focuses on the linkages between government, industry, and universities in the process of "knowledge capitalization" or commercialization of knowledge. Within the triple helix universities use their knowledge base in order to increase revenues (Etzkowitz, 1983). This activity can be the main attribute of an entrepreneurial university. Correspondingly, Etzkowitz's entrepreneurial university, generating knowledge, product and process innovations, is one of the elements of this complex innovation system.

The main feature of the model is that institutional collaboration provides flexibility to the innovation system and assures co-evolution for all three spheres. The interactive, cross-institutional relations between the three helices make the former borders disappear, because individuals and organizations within the helices are taking the roles of each other and the three spheres become integrated.

### *The Quadruple Helix Model*

The triple helix model focuses on the university-industry-government relations, while the quadruple helix model of Carayannis and Campbell (2009) extends this with the perspective of a media-based and culture-based public or what others call the civil sector or society. Alternatively, the fourth helix can be constituted by intermediate organizations or innovation-enabler organizations or the users (Arnkil, Jarvensivu, Koski, & Piirainen, 2010). The basic idea is that local culture impacts knowledge sharing and innovation; therefore, it is an important element of the innovation network.

This means that public interest is important in the process of innovation and scientific knowledge is increasingly evaluated by its social robustness and inclusivity. Urged by the increasing market competition, the modern innovation process is user-driven, in which firms often involve open business models, a greater focus on understanding latent consumer needs, and more direct involvement of users in various stages of the innovation process. For this reason, the focus of the quadruple helix type innovation process is somewhat different from the triple helix type innovation. It is primarily not centered on science-based high-tech innovation, but rather on producing user-driven or demand-driven innovations, and on applying existing technology and research knowledge, and user knowledge (Arnkil et al., 2010).

The literature on the engaged university (Chatterton & Goddard, 2000; Holland, 2001; OECD 1999) also focuses on the third role of universities in regional development, but it differs from the triple helix model in its emphasis on the responses of universities that adopted a stronger regional focus in their teaching and research missions. The evolution of the engaged universities ran parallel with the regionalization of the economy, or “the rise of the regions,” which means that the salience of the regional scale is increasing and the regulatory capacity of the nation-state declines (Arbo & Benneworth, 2007). Essentially, universities’ regional engagement means meeting the various needs of the modern client population, such as flexible structures for lifelong learning created by changing skill demands, more locally based education as public maintenance support for students declines, greater links between research and teaching, and more engagement with the end users of research (Chatterton & Goddard, 2000). Also, regional institutions including universities have gained more and more importance in the governance of the regional economy; therefore, universities as important parts of the regional networks have become more embedded in their regional environment.

The engaged university approach encompasses a range of mechanisms by which universities engage with their regions. The literature on the responsive university places less emphasis on academic entrepreneurialism, compared with the triple helix model, and more on community service. Here, community service means that the university is a community-based institution serving the needs of the society in a local area or region (Chatterton & Goddard, 2000). Unlike in the United States, European higher education institutions are highly dependent on state support. However, from the point of view of their regions, they function as autonomous institutions and have control over the nature of teaching and research, since they are under national regulations and raise the majority of their funding from national sources. Therefore, regional engagement is not inherent to these institutions. There is an external pressure from government, businesses, and communities for universities to align their core functions with regional needs. Universities also need to diversify sources of funding due to the rising relative costs of education, the intensifying competition for students and research contracts in conjunction with fiscal and demographic pressures, in order to maintain their academic standing and in some cases, to even survive. Taking a specific approach, OECD (1999) as well as Srinivas and Viljamaa (2008) analyzed the process and motives of becoming an engaged university in the context of institutional change and institutional interactions.

University engagement can incorporate several activities. Together with the shift of the higher education sector from elite education to mass education



and the prevalence of lifelong learning, there is a requirement from universities to educate graduates in compliance with the needs of the regional labor market. This means that universities provide an interface between graduates and the labor market in their region. According to Chatterton and Goddard (2000), engaged universities provide flexible structures for lifelong learning created by changing skill demands, and more locally based education as public maintenance support for students declines.

In the field of research, universities' engagement means greater links between research and teaching, and more engagement with the end users of research, for example, in the form of regional research networks and joint research with participants from academia and industry (Chatterton & Goddard, 2000). Since university research is conducted mainly in international academic networks, universities are able to channel the international knowledge to regional users. A considerable part of the literature, for example, Varga (2009), build on the notion that knowledge generation becomes localized and agglomeration effects are crucial for the spillover effects to work. Evidence proves (see, e.g., Drucker & Goldstein, 2007) the importance of proximity in supporting university-industry joint research efforts and other collaborations.

Universities engage with their regions not only in the fields of education and research but also in regional institutions and governance systems. This is the consequence of the previously mentioned phenomenon that the regionalization of state activity is increasing in Europe, and administrative and political decisions are increasingly made at the regional level (Chatterton & Goddard, 2000). For this reason, institutional capacities have to be built and extended at the sub-national level and sub-national policy networks have to be created. As important regional actors, universities are part of these governance networks (see Arbo & Benneworth, 2007). Individuals in the academic sphere take an active role in the civil society:

Academic staff, either in formal or informal capacities, can act as regional animators through representation on outside bodies ranging from school governing boards and local authorities to local cultural organizations and development agencies. Higher education institutions also act as intermediaries in the regional economy by providing, for example, commentary and analysis for the media. As such, they make an indirect contribution to the social and cultural basis of effective democratic governance, and ultimately, economic success through the activities of autonomous academics. (Chatterton & Goddard, 2000, p. 481)

In addition, the community service of the universities often takes the form of developing the social and cultural infrastructure of the region in accordance with the specific needs of university students and academics.

Arbo and Benneworth (2007) review the numerous aspects through which higher education institutions are embedded in their regions. These are primarily non-economic aspects including regional policy, national and regional innovation systems, human capital development and governance systems. They concentrate on the numerous interfaces through which the university and its region may be linked.

The impact of local universities is not restricted to the technical sphere, but may spread into wider social and economic effects on their region. Commitment to social and organizational innovation is gaining increasing importance as main barriers emerge from the social sides even if universities and regions try to introduce adopted technologies. Social and organizational innovation means in wider context the generation and implementation of new ideas and creativity in order to overcome the social barriers of innovation and it requires ongoing social interactions (Mumord & Moertl, 2003). Innovators face many social and managerial barriers that inhibit innovations. Among others, the inadequate funding, risk avoidance, incorrect measures and forecasts, lack of partnerships and deficiencies in collaboration are the most important social and managerial constraints. Social innovations facilitate the formation of new institutions, networks, and building up social capital through collective learning processes (Kitagawa, 2004). A good example derived even from the Silicon Valley proves this new trend as since 2008, Stanford University spent more on social and organizational innovation than on technology-oriented R&D!

## MID-RANGE UNIVERSITIES IN PERIPHERAL REGIONS

Many of the empirical studies on universities' regional developmental role and economic impact derive their findings from investigating large, world-class research universities located in highly developed economic environments. Nevertheless, Wright, Clarysse, Lockett, and Knockaert (2008) argue that those findings are not necessarily relevant for all universities, especially for mid-range universities. The main features of the mid-range, regional universities are that they are located in secondary cities where the regional demand for innovation is moderate: the density of contacts are much lower and possible spillover effects emerge more sparsely, they may not possess a base of world-class research, academics work in a smaller local scientific community in which they interact with the industry, and the creation of spin-off companies is different in nature (Wright et al., 2008).

According to Gál and Ptáček (2011), the model of university engagement can be adopted by those mid-range universities in the less developed East European regions that do not have the critical mass to engage in world-class scientific research, but instead *these universities* can focus on other than high-technology innovation. For the less developed, reindustrializing Central and

Eastern European regions with substantial human capital resources, benefiting from the relocation of European industry but not yet fully developed in terms of knowledge creation and transfer capacities, this special situation forces mid-range universities to take on new roles in contrast with other countries/regions where university-state-industry-citizen relations have perhaps had longer time frames to evolve. This new role means a stronger regional engagement in medium-tech innovations and in social and organizational innovation.

In their study, Huggins and Johnston (2009) compare the economic impact of universities of different types, and they found that there are significant differences in the wealth generated by universities according to regional location and the type of institution. According to their results, universities in more competitive regions are generally more productive than those located in less competitive regions, and more traditional universities are generally more productive than newer ones in the United Kingdom. Furthermore, the overall economic and innovative performance of regions in the United Kingdom is generally inversely related to their dependence on the universities located within their boundaries. This means that weaker regions tend to be more dependent on their universities for income and innovation, but often these universities underperform in comparison with similar institutions in more competitive regions. Although knowledge commercialization activity might be a source of productivity advantage for universities, markets for knowledge in less competitive regions appear to be weak on the demand side. Huggins and Johnston (2009) emphasize that the regional environment may also influence the actions of institutions, since a relatively strong knowledge-generating university in a relatively weak region may have a greater propensity to engage with firms in other regions. In weak regions the private economy's strength may be insufficient and small and medium-sized enterprises may be unable to exploit the benefits of the engagement with the universities. In the long term this may result in a leakage of knowledge from the home region, which further deepens the disparities in regional competitiveness.

Benneworth and Hospers (2007) focus on how peripheral regions that are functionally distant from core economic activities can reposition themselves in the knowledge economy. They argue that such regions are internally fragmented, which reduces their capacity to attract and embed external investment to reduce this distance, and upgrade their status among other regions within a technical division of labor. In regions with sub-optimal innovation systems, it is very hard to lay down the foundations of a sustainable local economic growth. In many regions, even international investments are not enough to generate such a local economic potential and critical mass that would enable these regions to develop on their own, without external influences.

According to Benneworth and Hospers (2007), a governance failure is in the root of this problem, namely the networking deficiencies. They list a range of

internal and external barriers that less-favored regions face when building local networks that exploit the knowledge spillovers of external investments. Internal barriers include a lack of local institutional capacity, a lack of critical mass or substantive outcome, the lack of entrepreneurial resources, and a mismatch between the science base and the knowledge users. External barriers to building and integrating local networks are the unfavorable economic specialization (to low-tech industries), externally imposed barriers to local governance integration, antipathy by external firm owners to local innovation, and poor external image discouraging potential investors.

The aforementioned situation is quite pessimistic. A more favorable picture can be drawn for peripheral regions if one investigates the universities' role in the local economic development. Benneworth and Hospers (2007) review the literature describing the ways universities can play an integrative role in the regional innovation system of less favored regions. For example, universities can help build large-scale excellence in research attracting new external partners; be an additional body/institution in governance networks, thereby increasing network connections; or provide educated and informed citizens for public institutions. Furthermore, universities can provide an inflow of new ideas to old industries, act as a big globally focused actor making demands for new kinds of planning arrangements, and actively shape development of programs through their consultancy that address and represent the cornerstones of regional innovation systems. Universities may strengthen the regional focus of the local actors through their long-term planning horizons, stability-oriented way of thinking, and interests that span beyond the host locality. As a consequence, universities' regional engagement is a key factor in the innovation-based economic development of the peripheral regions.

#### UNIVERSITY ENGAGEMENT IN CENTRAL AND EASTERN EUROPE AT THE MID-RANGE UNIVERSITIES

*Below Critical Mass—the Limits of Economic Impact of Mid-Range Universities in Central and Eastern Europe—the Regional Case from South Transdanubia, Hungary*

There is a substantial spatial concentration of top universities almost exclusively in metropolitan areas in the Central and Eastern European countries. Mid-range universities are most often located in non-metropolitan regions or, to put it another way, most of the universities outside the capital cities can be classified as mid-range, where the R&D potential and the “density of contacts” are much lower and possible spillover effects emerge more sparsely (see table 1). For this very reason, mid-range universities represent the keystones of regional innovation systems and are often crucial parts of regional innovation strategies

(Gál & Ptáček, 2011). During the transition in the 1990s universities were mostly facing the pressure of the state to increase their educational role. The system of universities' financing in this decade did not motivate them to search for new contacts and collaboration with industry and it was much easier to survive through increased matriculation.

TABLE I  
Main Characteristics of top and mid-range universities

	Top Universities	Mid-Range Universities
Location	Large agglomerations or smaller towns	Secondary cities/peripheral regions
N students	30,000–100,000	8,000–33,000
N researchers	3,000–15,000	700–2,500
Regional/global demand for innovation	High	Moderate
Critical mass in world-class research	High	Low
University-industry links	Higher frequency	Lower frequency
Critical mass in R&D	High	Low/very low
Match of regional economy and university's profile	High	Low

Source: Gál and Ptáček (2011)

The gradual “marketization” of the higher education sector started after 2000 as a result of several factors. In general, it was the recognition of knowledge as a source of economic growth. In the process of the marketization, universities started to use standard tools borrowed from Western Europe, but the result cannot be the same because of the different history and position of universities in the regional or national innovation systems. EU accession and the possibility to use EU development funds (such as cohesion funds) for building knowledge infrastructure induced an active approach on the part of universities. The establishment of the supporting innovation infrastructure (scientific parks, scientific incubators) was further developed at the universities thanks to the role of intermediaries (mostly technology transfer offices or R&D services), which focused, on the one hand, on building of ties with industry and, on the other hand, on gaining EU funds for infrastructure building. In that period, the trend of incoming foreign direct investments shifted from low-paid routine labor toward investments requiring a skilled and university-educated labor force. In this sense multinational companies have a pioneering role in the knowledge spillover from universities to industry (Ptáček, 2009 and Barta et al. 2011). The regional impact of these processes is leading to

the ongoing polarization of the R&D potential between metropolitan and non-metropolitan areas; that is, R&D resources and research capacities are increasingly unequally distributed among the regions (Ptáček, 2009; Gál, 2005 and Lengyel & Leydesdorff, 2011). This resulted in mid-range universities remaining the keystones of regional innovation infrastructure outside of the metropolitan regions, furthermore, even increasing their role. Sectoral research institutes set up in the socialist era and sponsored by industry and relevant ministries were mostly closed down after the regime shift, and so their role was taken over by local universities.

In sum, the role of mid-range universities in CEE countries is weaker than in more developed countries of the EU, and the process of adaptation to new social and economic conditions started substantially later than in Western Europe. At the same time mid-range universities located mostly outside of the metropolitan areas have to face similar problems and disadvantages as their Western counterparts, such as less intensive university-industry contacts, weak local R&D networks, and so forth (see table 2 and Gál & Ptáček, 2011).

TABLE 2

**Main Indicators of mid-range universities in Western Europe and their CEE counterparts**

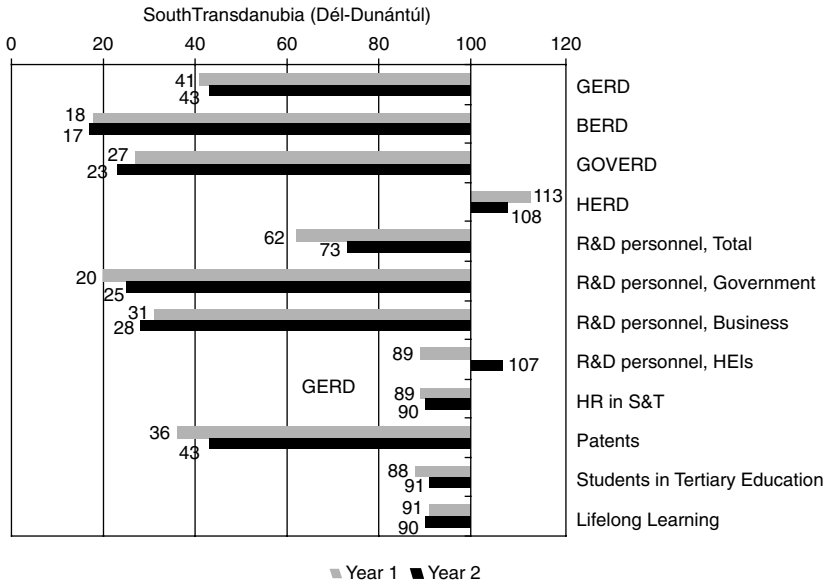
	University of Pécs (Hu)	UP Olomouc (Cz)	Nottingham University	University of Karlsruhe	Univer- sity of Ghent	Univer- sity of Antwerp
N students	28,000	22,000	33,000	15,686	21,160	8,029
N FTE researchers	1051	1158		2500	1401	846
N FTE technology transfer	6	7	4	1	3	4
HERD Mill. (Eur)	14	19.4	150	83	122	45
N spin-offs	11	7	27	unknown	12	2
Total RSBO	NA		NA		23	4
Regional GDP (Bn Eur)	6.7	11.2	103.8	316.9	157.3	157.3
GRP per capita (Eur)	6,900	9,600	24,145	29,694	26,194	26,194

Source: Gál and Ptáček (2011) and Wright et al. (2008)

It is often argued that universities are able to generate economic effects based on knowledge spillovers and innovation transfers to businesses (Etzkowitz, Webster, Gebhardt, & Terra, 2000). The differences between the advanced regions of metropolitan agglomerations and the most backward regions are emphasized in the relationship between universities and their regions (Ács et al., 2000). This means that in most of the non-metropolitan Central and Eastern European regions, where the regional innovation systems and the university-industry linkages are still weak, the role of universities in local development has to be revised and, consequently, the economic impact of universities cannot be unambiguously extended to transition economies. For example, a Hungarian study concluded that the knowledge-producing ability of the academic sector did not increase the knowledge-exploitation ability of the local business sector and, moreover, both universities and the less developed local economy may be responsible for several factors inhibiting intraregional knowledge transfer between universities and industries (Gál & Csonka, 2007). Similarly, Bajmóczy and Lukovics (2009) showed that university research for local economic development may be an outstanding instrument in the case of advanced regions but not necessarily for the less developed regions where the lack of an appropriate industrial base is one of the main constraints. They measured the contribution of Hungarian universities to regional economic and innovation performance between 1998 and 2004. The results showed that the presence of universities does not affect the growth rate of per capita gross value added and gross tax base per tax payer. Therefore, general economic effects of universities and related R&D investments are hardly visible in transition economies such as many Central and Eastern European regions.

Our case study area, South Transdanubia, is a less developed reindustrializing region with lower knowledge absorption capacity and with an underdeveloped research and technology development sector relative to the national average (figure 1). Basic conditions for change in the technology sphere are rather unfavorable. Its regional GERD was 23 M Euros in 2007, which is only 2.5% of Hungary's total. The region has one of the poorest R&D capacities in Hungary (in 2007 with only 4.1% of the Hungarian R&D employees). The region has a large public RTD infrastructure mainly based on the two universities<sup>1</sup> absorbing more than four-fifths of regional GERD, therefore the HEI<sup>2</sup> sector plays a dominant role in R&D performance (see table 2). Unlike the public RTD sector, the visibility and the performance of the business sector is very low, even in comparison with the national average. The RTD creation of the business sector in South Transdanubia is limited (€3.4 M BERD in 2004). Universities are the major employers of RTD personnel. The orientation of the knowledge creation activity of the region is based to a great extent on the profile of its universities, which have the strongest potential in life science (biotech) research and they also have a good reputation with measurable

FIGURE I Key indicators on Southern Transdanubia's Knowledge Base Development in comparison to the national average, in percentage\*



Source: Calculated by the author based on EUROSTAT and KSH (Hungarian Statistical Office) data

\*BERD = Business expenditure on Research and Development  
 GERD = Gross expenditure on Research and Development  
 HERD = Higher Education expenditure on Research and Development  
 GOVERD = Government expenditure on Research and Development

Note: The following years were used for BERD, GERD, HERD, and GOVERD 1999 and 2003; R&D personnel 1999, 2004; HR 1997, 2004; Patents 1999, 2003; and Lifelong Learning 1999, 2004

RTD outputs in laser physics, environmental, and animal cytology research.<sup>3</sup> However, the strongest barrier in South Transdanubia is the clear mismatch between the knowledge-production specialization of the universities and the economic structure of the region.

The main findings of this section are based on an empirical survey that listed 92 time-series indicators covering 20 different EU regions, including South Transdanubia, commissioned by ERAWATCH S.A. in Brussels (Gál & Csonka, 2007). This research was focused on the constraints of knowledge transfers in the case of mid-range universities in the less developed transition regions with traditional, non-research universities. The survey on South Transdanubia identified the main reasons for the poorer performance in RTD transfers. On the one hand, there is a mismatch between the economic and research specializations, which is combined with the low share of the business sector in RTD investment, the high share of the traditional lower tech



sectors, the small size of local SMEs, and the consequent lack of resources to invest into RTD and absorb its results. On the other hand, there is a lack of demand for research results from larger (mainly foreign-owned) companies and, to some extent, the necessary knowledge supply in the region for certain sectors and in certain disciplines is also lacking (Gál & Csonka 2007).<sup>4</sup> It should be also understood that these regions specialize in activities that are not highly research intensive, therefore increased R&D expenditures cannot be easily exploited by local businesses or utilized by HEIs. In these situations, setting up a new research base that is not linked to the needs of the regional economy could be like building “*cathedrals in the desert*,” as they are unlikely to be able to develop knowledge transfer and spillovers with local economic actors, particularly for high-tech industries (Dory, 2008; Gál, 2010).

### **STRONGER UNIVERSITY ENGAGEMENT: THE HUNGARIAN CASES**

Universities can act as regional actors, developing stronger partnerships between universities and the regional development agencies, emphasizing the key role of higher education in regional development. The policy approaches and activities in CEE regions almost exclusively concentrated only on the first two missions of the universities, and the notion of regional engagement did not constitute part of the university strategies up until very recently. Two compelling endogenous and exogenous factors have contributed to the recognition of the importance of stronger regional engagement of the universities recently. Firstly, the accumulated knowledge and the experiences of staff at the higher education institutions provide expertise in various fields, and this can be a very effective way of accelerating progress of collaboration through the exploitation of economic and social interactions transmitted by spin-offs and other university-based consultants within the newly formed regional networks. Secondly, exogenous pressures are exerted by new market demand and policy goals that envisage a real regional and social prosperity that integrates knowledge, social, and human development. This exogenous factor facilitates connectivity among different institutions including universities and other stakeholders and will provide not only better funding opportunities but also a collective learning platform for social interactions (Leydesdorff & Etzkowitz, 2001).

In the following sub-sections we present two case studies the authors participated in, from South Transdanubia, which show the new types of developmental roles and community engagement that local universities can take in a peripheral, border region in order to revitalize the economy of a lagging, de-industrialized area. The first one presents an example of a urban development project based on campus (property) development in conjunction with the European Capital of Culture 2010 project and a city development strategy of the health and environmental sectors. The second one provides insights into

the building of a common cross-border knowledge region in the framework of university partnership. It is characteristic of both case studies that the strategies are strongly reliant on the contribution of the local academic sector.

*University Engagement in the South Transdanubia Region: The European Capital of Culture 2010 Project and the So-Called Growth Pole Development Programs*

In the case study presented in this section we focus on the biggest city of the South Transdanubia Region and its university. The city of Pécs has adopted two strategies with strong collaboration of the University of Pécs to mobilize endogenous resources and enhance its competitiveness (University of Pécs is the oldest university in Hungary, established in 1367). Higher education has been a strong driver of economic restructuring; in fact, it was probably the university that saved the city of Pécs from the depression experienced by other Central and Eastern European industrial regions after the change of the political regime—even if it could not fully prevent the disadvantageous processes (Lux, 2010). In the 1990s and the 2000s, Pécs, the city with 2,000 years of history dating back to Roman and medieval times, has lost most of its economic potential, which was built on coal and uranium mining and several industrial plants. Due to its peripheral situation and the adverse effects of the war in the former Yugoslavia, foreign direct investments are insufficient in the region and there is a lack of local economic strength. In an economic environment characterized by a decreasing industrial sector, the city's cultural, educational, and market services give a chance for the economy to rise again. Cultural issues first appeared markedly in local development policy in the 1995 city development strategy, which envisaged a growth path built on knowledge-based economy, services, and innovation, where innovative tourism and “cultural industry” take precedence (Lux, 2010). After the integration of several local universities and a number of smaller higher education facilities in 2000, the University of Pécs has become one of the largest employers in the city and even the region. Although R&D outputs in engineering and natural sciences and the university-industry links are limited, the presence of students and employees has had a multiplier effect on the economy of Pécs, mainly in the field of rented flats, consumer products, and services and culture. Of course, the university has contributed to the urban ambience and real estate site development of Pécs, as well (Lux, 2010). One of the strategies is a comprehensive initiative that aims to reconfigure the economy of the city to utilize the heritage and cultural basis in the framework of a singular large project, the European Capital of Culture 2010, to generate growth. The European Capital of Culture 2010 project tries to capitalize on the idea of culture-led urban regeneration and helped Pécs to reinvent itself through culture. The University of Pécs has played a major role in organizing the European Capital of Culture project, which became

the largest ever exercise of community service of the local university, being heavily involved not only in cultural events but also in the development of the new cultural, community, and educational functions of the city's newly built cultural quarter (Lux, 2010). The project is the Zsolnay Cultural Quarter: built on the site of the eponymous ceramics factory—originally established as a mixture between production facility, artist's colony, and living environment for the owner and his family—it intends to endow a disused area with new cultural, community, and educational functions serving as the new training site for the university's Faculty of Music and Visual Arts (Lux, 2010). Benneworth et al. (2010) describes the university's urban development role and the major factors conditioning the success of cooperation for both the city and the university in detail.

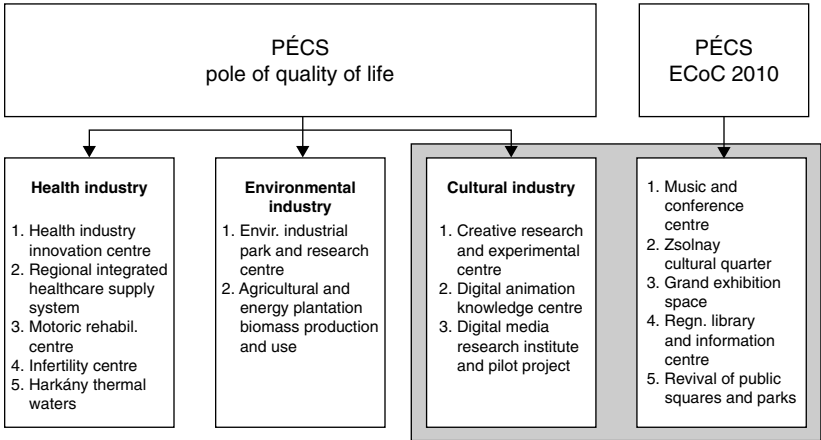
The strong university engagement in the city's development was also reflected by the growth pole program<sup>5</sup> called Pécs—Pole of Quality of Life, which has three pillars: health industry, environmental industry, and cultural industry. Similar to the European Capital of Culture 2010 project, the “growth pole” program has strongly involved the contribution of the University of Pécs during the planning period as well as in the governance and the implementation, especially within the health industry pillar and the environmental industry pillar. (See figure 2.) The main features of this program are introduced by—among others—Lux (2010, p.116) as follows:

Health industry encompasses health services built on the basis of the university's Faculty of Medicine and its clinics, which have achieved especially strong results in treating movement-related disorders. Linked to this service package is a range of industrial functions, especially the manufacturing of medical and prosthetic equipment; but also further services which benefit health through regeneration and recreation. Health is thereby connected to the consumption of culture. “Cultural industry,” also expected to benefit from the 2010 ECoC programme, once again returns to the idea of promoting the urban culture of Pécs as a complex, innovative product. “Environmental industry” is both narrower and wider than the “quality of life” concept: it could be said to be helpful in fostering a cleaner, more attractive environment, but the actual development projects focus more closely on alternative energy sources.

*University Engagement through the Hungarian–Croatian Cross-Border Programs: Lessons from the “South Pannonia” Region*

Another initiative under the umbrella of universities' engagement is the Hungarian-Croatian cross-border project, titled Regional Universities as Generators of a Transnational Knowledge Region: UNIREG IMPULSE, started in the “South Pannonia” region with the aim of developing a knowledge

FIGURE 2 The system of cluster initiatives and projects in pécs



Source: Lux (2010, p. 115)

region based on the universities’ active regional engagement—their third mission—mediating organizational and social innovation by strengthening networked relations between universities and regional actors (figure 3). The project initiates networking relations on three different fields: rural development, strategic and regional planning, and environment and sustainable local energy systems. There is a vast scope for enhancing the universities’ regional, economic development and knowledge disseminating role in the region. Besides mainly bilateral educational and research relations between the region’s universities, there is a need for building the channels of local knowledge flows toward their lagging, underprivileged hinterlands in those fields also where not primarily high-tech-oriented R&D activities are demanded. Instead, the specific regional development impacts of the universities and their social and organizational innovations as well as knowledge generation and transfer through contact with local actors contribute most to local development.<sup>6</sup>

The central problem of regional development in the cross-border area is that these regions are not only peripheral but also below average in terms of the economic development in both countries. The neighboring border regions have a common interest in sustaining open borders in order to reveal and exploit the potential advantages of cooperation in the fields of education and economic and social activities, which should be customized to the region’s geographical specificities.

Actually, it was after the millennium that local governments along the two sides of the border area have started to make contacts with each other, thereby linking almost the entire border region, and have undertaken activities that influence progress in their environment. The various interregional, organizational, and sectoral applications and their implementation resulted in

FIGURE 3 Cross-border areas of Hungary and Croatia covered by the UNIREG IMPULSE Project



Source: <http://www.hu-hr-ipa.com/>

mutual idea formation and ambitions, as well as the creation of institutions on both sides of the border that are able to engage in mutual tasks on the basis of value-creating cooperation.

The general aim of the project was to motivate a more active regional engagement of the universities—in terms of their third mission—and to create a South Pannonian knowledge region that is based on the knowledge networks transmitting organizational and social innovation through the strengthening of the network relations between the universities and the regional actors. The regional academic sector possesses those intellectual capacities through which the cross-border region's inherent specificities, problems, and mutual development perspectives can be envisaged. The project activities included the establishment of a knowledge transfer office as the organizational framework for the implementation of the third role of the local universities, the development of the cooperative knowledge networks, and the creation of a knowledge map to serve as a basis for stronger cross-border cooperation between the universities.

In this case structural changes and cross-border social dialogues should all be regarded as priorities. Due to the region's economic, geographic, and environmental specificities, the new cross-border knowledge region that extends the

innovative capacities of the area should be built on the foundations of regional development instruments and rural economic development opportunities.

Our approach assumes that the expansion of the universities' functions can be interpreted as a social and organizational innovation, while as a result of project activities, a new cooperation interface emerges between the knowledge sector and the industry, which is in accordance with the aims of the project. Dissemination, knowledge maps, joint knowledge transfer office, webpage development and workshops, publications, and reports addressing the specific problems of the region help achieve the overall goals of the project while they provide frameworks for analyzing, planning, and implementing new communication and cooperation forms in the field of social and organizational innovation.

In summary, the main implications of the case studies are as follows:

1. Higher education has been a strong driver of economic restructuring, and urban development/regeneration of slum districts within the city contributes to the urban ambience and real estate site development of cities. University of Pécs has not only played a key role in supporting urban development and regeneration through campus development (Regional Library and Information Center, Cultural Quarter, etc.), but it also contributed to the quality of urban governance and to place branding (external image creation) of the city. These new development sites take part in the development of new cultural, community, and educational functions of the city generated by the university.
2. The UNIREG IMPULSE project called for an active cross-border engagement of the regional universities in order to create a transnational knowledge region through organizational and social innovation and strengthening networked relations between the universities and regional actors. The project was useful, on one hand, for the regional universities, since it included elements for defining the universities' growth strategy (third role, social visibility, strategic involvement), and with the active involvement of the relevant regional stakeholders universities increased their partnership as a potential for future collaborations. On the other hand, the project was useful for regional and local government bodies because it provided a synthesis of Hungarian experiences on EU accession and expert guidelines for the transition on a regional level based on expressed needs. It can be concluded that universities have to be relevant players in the development and evaluation of regional policy that fosters "new combinations" of partnership-based, innovation-centered approaches, which maximize the development of human capacities such as skills and mobility, and the formation of social capital through networking, collective learning, and building trust.

## CONCLUSIONS

This article has applied the regional and community engagement literature to mid-range universities of Central and Eastern Europe and explored the peculiarities and specificities of these mid-range universities facing a number of extra constraints in the less developed CEE regions. After summing up the ways in which universities may contribute to the economic development of their regions and presenting the measurement methodologies and theoretical considerations, the article focused on the problem of adapting the literature on peripheral regions with mid-range universities. From the presented theories, the literature on the universities' regional engagement is the most relevant in the context of our article. There are several facilitating and hindering factors concerning the process of becoming a regionally engaged university, and our main lesson is that the whole regional innovation system should be developed in an integrated manner in order to reach this goal.

The mentioned constraints impede peripheral, mid-range universities to build linkages to the local economy and develop internationally recognized areas of research excellence, with the associated critical mass, and exploit the advantages of global knowledge networks. The research found that not only the position of universities in the collaboration with business sector but their role in the innovation system is quite different, which is mainly due to the different development path of innovation systems and development trajectories in post-communist countries described herein. Because of historical path dependence, mid-range universities, unlike top universities, are very often located in non-metropolitan regions in CEE countries where the RTD potential and "density of contacts" are much lower, and possible spillovers emerge more sparsely than in capital city regions.

We argued that in these regions, setting up new university-based research directions that are not linked to the needs of the regional economy are unlikely to be able to develop knowledge transfer and spillovers with local economic actors. In peripheral situations the lack of research capacity in science and engineering RTD can be also a serious obstacle to the modernization of the industrial structure. Universities are looking for contacts out of the regions and their contribution to the regional innovation infrastructure cannot fulfill the possible expectations. Rather, these universities need to take careful strategic decisions to build up those areas and the related intermediaries where they have the scope to make an international impact but also to differentiate investment in those areas where they can make a regional contribution.

Economic policy practices suggest that the support of university research for stimulating local economic development may be an outstanding instrument in case of advanced regions but not necessarily for the less developed CEE regions where the lack of an appropriate industrial base is one of the main constraints.

It can be also argued that business-led networks connecting different actors have much higher importance in economically advanced regions while in the less advanced ones universities and public agencies play a more significant role in network building and in catalyzing activities of the key actors. If universities are embedded in a region it has a clear impact upon the intensity and nature of the relationships and, hence, their ability to effect tacit and codified knowledge transfers. Regionally focused teaching and research are manifest in a stronger focus on regional student recruitment and graduate retention (in order to combat brain drains in R&D), the innovation-oriented regional development programs addressing skills required by regional industries, and the localization of learning processes.

The article also argues that mid-range universities in the reindustrializing CEE regions have to take on new roles, which means a stronger regional engagement also in medium-tech innovations and in social and organizational innovations. Universities have to be practically relevant in the development and evaluation of regional policy that fosters “new combinations” of partnership-based, innovation-centered approaches, which maximize the development of human capacities such as skills and mobility, and the formation of social capital through networking, collective learning, and building trust. In the less developed CEE regions there is a need for much more comprehensive and complex economic policies initiating not only the support of the university sector but also the development of high-tech industries, small-scale enterprises, and constructing regional advantage with the stronger developmental role and community involvement of universities. This contributes toward the third mission of universities through meeting learning needs of the region. This might be achieved by exchanging knowledge between higher education and the business community or through outreach to local communities to combat social exclusion and to improve cultural understanding.

## NOTES

1. University of Pécs (est. 1367) and University of Kaposvár (est. 2000).
2. Higher Education Institute.
3. The relative strength of the biotech research base is demonstrated by its large share of total input-output indicators and also by the increase of RTD spending in this field (64.8 M in 2004). In addition, the 11 university spin-offs in the biotech sector are tightly connected to the Medical School (MS), which has 48 employees and produces a turnover of €3 M (2004).
4. A few large enterprises in high-tech electronics have been engaged in high-tech activities, but their influence on the local RTD sector is considered to be marginal, as they usually rely on the in-house RTD activities of their parent companies importing technology from outside the region.



5. The development pole-based type of development appeared in France and its main characteristic is that the central motivator of the development process is the university. The overall aim of the pole program is to promote the formation of internationally competitive clusters; specialization on high value-added, innovative activities; strong cooperation primarily between businesses and additionally between universities and local governments; and strengthening the regions through the increasing competitiveness and better business environment of the pole cities. The expected results (for the period between 2007 and 2013) include that the businesses—through clustering and the cooperation with the academic and university sector—reach the critical size necessary for being competitive in Europe, and pole cities emerge as centers that are able to strengthen and sustain competitiveness for both themselves and their surrounding regions on an international scale.
6. In the project the social-organizational innovation mediated by the academic sector served to strengthen the social and organizational foundations of the local economic development and focused on the development of human resources in which the different forms of knowledge have a key role. The adult education and professional training courses organized by the universities, the exchange of practical knowledge bound to certain sectoral policies, development priorities, the elaboration of development strategies, and practical development programs (in rural development and in the environmental sector) customized to the demands of local society and the universities' narrow and broad environment are important components in the increased regional engagement of universities.

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