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**Department of Regional and
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The Faculty of Economics



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Learning Regions in Theory and Practice

Edited by J. Kern, J. Malinovský and J. Sucháček

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Editors: Jiří Kern
Jan Malinovský
Jan Sucháček

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Preface

Economic and geographical worlds become increasingly penetrated by learning regions. Learning regions constitute the most modern and at the same time rather vogue conception that strives for the explanation of economic development in space. Institutional features of regions, networking, embeddedness, capability to learn and innovations represent the notions that are frequently used both in theory and practice of local/regional development.

At the same time, conceptualisation of learning regions remains at the negligible level, which is one of their cardinal weaknesses. The situation becomes complicated even more in view of the fact that both the nature and the application of learning regions differ principally in advanced and transitional countries. History simply matters and institutional characteristics of both aforementioned types of economies are markedly different, which shapes the application of learning regions in the territory concerned.

The editors of this book endeavoured to create the certain platform of opinions on the popular, but often contradictory conception of learning regions. The book includes altogether 11 contributions of high-ranking scholars and other experts from various European countries that deal with both theoretical and practical aspects of learning regions.

Last but not least, we would like to acknowledge the support of Grant Agency of the Czech Republic and thank all contributors to this remarkable collection of papers related to learning regions. We would also like to thank David Katrenčík for his technical support.

Jiří Kern
Jan Malinovský
Jan Sucháček

1

Learning Regions: Towards a Container Conception

Jiří Kern, VŠB – Technical University of Ostrava

Jan Malinovský, VŠB – Technical University of Ostrava

Jan Sucháček, VŠB – Technical University of Ostrava

1.1 Introduction

Last three decades witnessed profound changes in the theories related to regional economic development. Exogenous conceptions that were in vogue in 1950-ies and 1960-ies relied primarily upon external financing and interventions. These conceptions succinctly describable as 'top-down' approaches were gradually replaced by remade, so-called 'bottom-up' conceptions that stress the importance of internal, endogenous potential of the territory.

However, newly created 'bottom-up' approaches do not mean mere purification of traditional endogenous conceptions from the dust, on the contrary, they represent the transformed conception, which accentuates namely the shaping of frame conditions for the sake of stimulation of endogenous developmental potential in individual regions. Hence, we are fully entitled to label them as 'neo-endogenous' conceptions. More importantly, neo-endogenous approaches towards regional economic development became commonly accepted paradigm of our days.

The emerging conception of learning regions is generally classable just under neo-endogenous approaches towards regional development. At the same time, learning regions are strongly influenced by institutional and evolutionary economics that constitute rather frequent inspirational sources for modern conceptions of regional development.

Nelson (1998) rightly points out that traditional economic theory largely omits several relevant factors that account for existing differences in the rate of economic growth. These problem spheres are as follows:

- Technologies and innovations,
- Interconnectedness among enterprises and their milieu,
- Spatially rather differentiated formal and informal institutions.

The innovations, process of learning and disclosure of new approaches and new solutions constitute the key to the comprehension of existing differences in economic efficiency among particular towns and regions. These processes are to a great extent path dependent and can be only hardly conceptualised. The same applies to boundary spanning structures among organizations and their milieu, which are also frequently underestimated and amazingly small amount of research has been devoted to their clarification. And finally, innovations can be grasped also as a product of processes in the framework of particular institutional milieu that could hamper or enhance their birth and diffusion.

Not surprisingly, contemporary neo-endogenous theories on regional economic growth and development, such as industrial districts (Bagnasco, 1977, Becattini, 1978 or Brusco, 1982) or so-called network paradigm (Cooke and Morgan, 2002, Grannovetter, 1991) or local embeddedness (Amin and Thrift, 1994 or Malmberg, 1996) reckon not only with traditional economic factors but also with non-economic ones. The latter do not have economic character but they bear abundant economic implications and contribute to the formation of 'integral productivity' of states, regions and localities. From the methodological standpoint, an idiographical character of concrete localities and regions is often emphasized. The attention is frequently devoted to evolutionary character of changes in the socio-economic organisation of society as well as to the historical development of institutions.

Numerous institutional economists, economic geographers and regionalists rightly claim that inclusion of these institutional factors in the thoughts about economic growth and development enables us to use holistic approach against one-sided success of reductionism. It is thus only hardly surprising that institutionally directed conceptions currently constitute one of the most dynamic streams in spatial sciences.

In the course of the 1990-ies the discourse about institutional characteristics of regions, the networks of contacts, embeddedness and their utilisation in regional policy has crystallised into the new direction of regional development called 'learning regions'. Learning regions constitute historically the youngest (and still developing) theoretical conception that accounts for territorial economic development (see Lundvall, 1992 or de la Mothe and Paquet, 1996).

The promoters of 'learning regions' claim that the source of regional competitiveness consists in the knowledge, capability to learn and to create the cultural setting that fosters the innovations. The problem of learning is not connected merely with advanced economic sectors and development of new technologies, but also with innovations that arise in the territory of given municipality or region. The competitiveness is not comprehended as a price competition but as a competition based on unceasing innovations. Knowledge is perceived as the most strategic 'source' and learning as a decisive process from the perspective of competitiveness. The differences in the capability to learn and to innovate are grasped as a key mechanism of regional differentiation and their role will even augment with highest probability in the future.

Maskell and Malmberg (1999) underline that regional capabilities can be seen as the combination of human and physical resources available, the structures established in the region through time, and region's specific institutional endowment as they are shaped by the previous rounds of knowledge creation. They claim that by embodying knowledge useful for particular classes of activities the institutional endowment reinforces the path-dependent nature of regional economic development.

According to these authors, over time, regional capabilities change as resources are exhausted, as structures decay and as institutions degenerate or become outdated. All these processes lead to a deterioration of regional competitiveness. Others might even imitate some of the region's capabilities thereby turning them into ubiquities. Sustainable regional competitiveness implies that the process of asset erosion must be compensated by the formation of new capabilities through the replacement of decrepit resources, the rebuilding of obsolete structures or the renewal of outdated institutions.

Nijkamp and van Geenhuizen (2002) point out that despite its popularity, the paradigm of learning regions remained poorly conceptualised and poorly tested in empirical studies. While there are many good case studies of learning regions, we lack comparative studies based on a common research design. A poor conceptualisation is also true for the development of learning regions over time (see for instance Boekema et al, 2000).

Indeed, the enthusiasm connected with learning regions is often missing its rationale. From theoretical point of view, there exist a couple of generally accepted principles but what we are still missing is bigger, consistent and solid theory. From practical point of view, Nijkamp and van Geenhuizen (2002) underline that we cannot be conclusive about what is the best for regional development since there is nothing like best practice but number of good practices. Learning regions were largely based on case studies so far. This essentially means return towards idiographical regional economics and resignation on the creation of generally utilizable conception.

The main objective of the chapter consists in the review of both theoretical and practical categories connected with the conception of learning regions. Apart from theoretical and practical shortcomings of this conception a new, dangerous tendency appeared in recent years: learning regions serve as a shelter or container for various, typically rather heterogeneous approaches to regional development. What do they have in common is possibly only their – either real or pretended – innovative nature.

1.2 Common Denominators of Learning Regions in Theory

In spite of not-yet-matured character of learning regions, there exist certain categories and principles that are generally accepted as inseparable part of this conception. However, closer scrutiny discloses that they are surprisingly slim in

numbers. The following paragraphs bring an essential overview of these categories and principles.

The supporters of 'learning regions' distinguish between codified knowledge and tacit knowledge. While codified knowledge can be standardised and can be learned via instructions and plans, the latter can be gained only by means of our own experience and participation when practising the given activity. Codified knowledge can be usually sold as a product. On the contrary, tacit knowledge and skills become the source of competitive advantage as they are bound to specific regional context and institutional characteristics of the territory, such as networks of contacts or forms of embeddedness.

Tacit knowledge and skills are represented for instance by the ability to reach the consensus or the way of the stimulation of workers. Lundvall et al (1992) asserts that tacit knowledge constitute collective entity and therefore they are necessarily connected to the process of socialising in given social context. As Maskell and Malmberg (1999) point out, in an era when codified knowledge is globally disseminated faster than ever before, tacit and spatially much less mobile forms of knowledge are becoming more important as a basis for sustaining competitive advantage.

Learning and innovations in the region usually are not isolated. The learning and innovative potential is substantially influenced by the form of relations among regional actors and their milieu (see also Malmberg, 1997). Milieu is perceived not as mere networks of relations with the other actors and institutions but as a general framework for all activities. It comprises institutional structure, social values or political culture of the country or region, in which the actor is embedded (see Lundvall et al, 1992).

Generally, the most relevant characteristics of learning regions can be expressed as follows:

- Existence of the higher number of regional actors (municipalities, towns and cities, enterprises, firms, NGOs etc.). Their interactions can facilitate the exchange of information and new ideas.
- Existence of consulting, R&D institutions and transfer centres that co-operate with the other regional actors. This raises the probability of the occurrence of industrial innovations and retroactively it forms also the quality of these institutions.
- Regional culture and institutions. This category is the most problematic one since it is hardly possible to stipulate normatively, what should be the character of the culture and the institutions in the region in order to maximize its capacity to learn and to innovate.

From the functional standpoint, it is possible to distinguish several forms of learning:

- Learning by doing,
- Learning by using,
- Learning by searching,
- Learning by interacting.

According to Lundvall et al (1992) learning by interacting is the most typical form of learning in regions.

Conception of learning regions stresses intensive interactions among regional actors as well as an existence of trust-based relations and supportive institutions that facilitate the mutual communication. The capability to learn depends not only on spatial proximity and agglomeration effects but on more general character of regional culture and on the way, in which particular networks of contacts are combined, blended and complemented by practices and routines and further forms of institutional embeddedness. Amin and Thrift (1994) speak about so-called 'institutional thickness', which forms the base for the institutional adaptation of regions. The institutional quality of region is based on:

- The existence of traditional institutions, which secure regional planning and development.
- The high quality of contact and co-operative behaviour among these institutions that is based on keeping both formal and informal rules.
- Exact definition of competences and financial resources inside as well as among these institutions. The creation of co-operative coalitions should be enabled.
- The employees of these institutions should act 'regionally consciously'. The existence of common vision and priorities of regional development is indispensable in this context.

Apparently, 'institutional thickness' is requisite but not sufficient condition of regional development. However, 'institutional thickness' serves as a basis for the formation of creative milieu in the region, which is the decisive factor of the generation of innovations inside the region.

Networks of contacts and relations among regional actors increase the capability of regions to mobilise the resources and information and respond to the changes of the socio-economic circumstances more flexibly. The existence

of the networks of contacts with different quality and different rate of trust creates the context, in which socio-economic transactions take place. These networks represent the basis of market mechanism, which can be empirically and rather exactly analysed. Every regional actor (an individual, an enterprise etc.) is connected with the networks or is embedded in the networks of contacts that to a large extent predetermine his or her possibilities (see for instance Granovetter, 1991).

The next specific form of learning is so-called benchmarking or the orientation to the best practices. The main mission of benchmarking is to analyse the differences among regions and to seek the causes of these differences at the same time. In order to keep the competitive advantage, the regions strive for reaching the quality standards. If possible they try to be better than their competitors. In comparison with traditional competitive analysis, benchmarking provides two advantages:

1. The comparison is not made with direct competitors but with these that implemented the innovations and are on the very top at the moment.
2. In case, we compare ourselves with non-competitors or indirect competitors, the exchange of primary information is much easier.

It is thus possible to state that from the spatial perspective, factors determining economic growth and development of both urban areas and regions are becoming increasingly intangible, like institutions and socio-cultural settings and relations and increasingly mobile, like capital, codified knowledge and partly human capital (see also Nijkamp and van Geenhuizen, 2002).

So, in sum, theoretical basis of learning regions is distinctively of multidisciplinary and at the same time of heterogeneous character. At the first glance, this should not be harmful since it allows us to draw on more realistic picture of local/regional development; however, a short excursion into practice reveals that inner fulfillment of theoretical categories and principles is relatively a superficial one and concerns much wider scope of problems than stated by learning theory.

1.3 Contradictory Meanings of Learning Regions in Practice

As it could be seen, learning regions represent new and still developing conception, which can only hardly be delimited in a more general way. From this point of view, they cannot be accepted as a theory, which creates system of knowledge, in which bigger discrepancies cannot be found.

The whole conception is of idiographical character and does not want to offer general conceptions, but concentrates rather upon particular case studies of localities and regions and attempts to identify a unique economic-institutional

constellation that led to blooming of these areas. Moreover, learning regions represent quite frequently 'old wine' in a 'new bottles'.

From the practical standpoint, learning is often connected with innovations. More precisely, learning is a process, by which the qualitative improvements in economic-organisational categories should be reached. However, these improvements necessarily vary both in their scope and intensity.

Innovations are based on layering the previous knowledge, but in contrast to the investment projects, they are not introduced consecutively on the basis of their efficiency. Semi-random character of innovations practically eliminates the creation of more general conception of learning.

Further, one has to consider rather differentiated socioeconomic level of individual countries, regions as well as particular subjects. Hence, the innovations will again necessarily be of heterogeneous character, which is based on both knowledge-stocks as well as contemporary needs of different territories or subjects. It is closely connected with the different interpretation of the notion of learning regions. While in some countries, the learning region is characterised by the implementation of internet into educational institutions, in another country learning regions are labelled by support of high technologies or managerial innovations. To sum it up, learning process always concerns a particular rank and subsequently, from vertical perspective, its characteristics vary.

A couple of examples will show that the same holds true also for functional – or horizontal – differentiation of learning processes. Thus, learning process is currently used in connection with the following spheres:

- New approaches towards the city or regional management. This ranges from the rationalisation strategies directed towards the application of business concepts into the public sector (see Sucháček, 2003a, 2003b) to the increasingly popular issue of governance (see for instance Barczyk and Ochojski et al, 2005).
- Urban regeneration, which typically consists in redefinition of functional categories of urban life and physical remodelling the city. This is often accompanied by the changes of social component of urban life (e.g. Murzyn, 2006).
- Networks and networking. They became an inherent part of qualitative characteristics of territories and increasingly influence spatial interactions as well as spatial structures (see also Sucháček, 2005a).

- Social capital that is a concept with a variety of inter-related definitions, based on the benefits stemming from social networking and connexions.
- Innovations in business, for which terms, such as organisational learning and networks, systems of innovation or the role of proximity in the transfer of information and knowledge are characteristic (see for instance Boekema et al, 2000).
- Education, with very wide implications from the role of universities in territorial development to the changes in educational systems (for instance Pellenbarg, 2005 or Sokolowicz, 2005)
- Entrepreneurial issues, which also concern wide spectrum of issues that should stimulate the competitiveness of subject in question (see for example Barczyk and Ochojski et al, 2005).
- Urban and regional marketing that strives primarily for the approximation of urban or regional product to the given target group (e.g. Sucháček, 2005b).
- Clusters in the sense of the association of economic subjects that cultivate and deepen their supplier-customer relations.

It must be stated that this list is far from complete. However, only such a brief enumeration discloses the heterogeneity of learning regions. Put less euphemistically, a fine chaos embraces the whole conception. In spite of these developments, there are unceasing endeavours to gather various learning approaches under seemingly safe shelter of learning regions. Symptomatically, learning regions are often connected with the support of educational and developmental activities in the framework of the EU regional policy.

Last, but not least, learning regions have different meanings in advanced developed countries and in transitional ones that underwent entirely different – and distorted – development from institutional point of view (more about it in Sucháček, 2005c). These system differences are not classable under horizontal nor vertical dimension of learning regions. Their importance lies in the creation of entirely specific societal contexts.

1.4 Conclusion

From the perspective of regional development, learning theoretically forms a useful concept. Learning can act as one of principal stimuli of endogenous development, which is truly efficient as it changes the quality of socioeconomic structures of individual localities/regions. At the same time, learning regions

represent immature conception, which desperately calls for further development. There exist great and augmenting differences in the perception of the process of learning from both vertical/rank and horizontal/functional standpoints. Learning regions thus cover heterogeneous approaches from both theoretical and practical points of view and form container conception indeed. Hence, it is hardly surprising that transferability of learning processes into different regions constitutes strongly debatable theme and individual territories are compelled to rely rather on their own developmental strategies. Generally, learning is often reduced to a 'cure all' for the maladies affecting contemporary life but at the same time it lacks the robustness in both theoretical and practical terms.

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2

Increasing Competitiveness of High Technology Firms: An Evolutionary View on Learning Regions

Marina van Geenhuizen, Delft University of Technology

Peter Nijkamp, Free University of Amsterdam

2.1 The Age Of Innovation and Learning

Innovation is often seen as an act of an individual entrepreneur who is forced by market competition to look for new business horizons, such as the design and production of new commodities, the creation of new organization modes, the exploration of hitherto unknown markets, or the participation in novel institutional ramifications. This Schumpeterian wisdom calls for permanent adjustments, for an uninterrupted search for high-risk but potentially high-revenue actions. Innovative entrepreneurship is indeed a cyclical activity of challenge-response-challenge, which will never grind to a halt.

Permanent creativeness, driven by permanent market competition, requires a high degree of learning capability. Innovativeness is not a blueprint activity, but requires a flexible and open mind of an adaptive entrepreneur. This holds for each stage of the production process, from design to marketing (see inter alia Belderbos, 2003; Iansiti and Levien, 2004; March, 1991; Tripsas, 1997). This awareness has in recent years led to the concept of the learning decision-maker or the learning entrepreneur.

Learning mechanisms have become a fashionable topic of study in recent evolutionary theory. The origin of evolutionary thinking can be found in population biology and ecology, which have prompted new research departures in the social sciences on self-organizing processes (see e.g. Ayres, 1994; Holland, 1998). Evolutionary theory has led to novel concepts in evolutionary economics (see e.g. Hodgson, 1993; Nelson and Winter, 1982). The study by Nelson and Winter has indeed offered new perspectives in economic thinking, as they introduced gradual economic dynamic as a result of changes in routines of actors. They highlighted three important elements of a micro-based interpretation of such routine changes, viz. organization routes on the bases of self-organizing behaviour, search and decision-making routines on the basis of a novel assessment of information and transaction costs, and adjustment or resilience based on changes in the selection environment (including network constellations; see Potts, 2000).

Evolutionary economics has gained much popularity in modern economic growth theory, especially in an endogenous growth context (see e.g. Aghion and Howitt, 1998). Knowledge and its spillovers to third-party firms are seen as potent factors generating growth. Moreover -according to some scholars - this spillover process is actively driven by economic agents and entrepreneurship is an important mechanism in driving that selection process and in creating diversity of knowledge which in turn serves knowledge spillovers (e.g. Audretsch and Keilbach, 2004). In addition, learning-by-doing is a special routine that fits well in the overall framework of evolutionary thinking. The micro-economic foundation of evolutionary economics has led to much attention to individual actors or decisions-makers, such as entrepreneurs. But to some extent also regions or cities may be seen as business actors who through innovative action and creative destruction have the responsibility to lay the foundations for regional or urban vitality. The present paper will address the notion of learning regions in a competitive policymaking environment.

Since the early 1990s concepts of learning regions, smart cities, creative cities, science-based regional development, etc. have received an increased attention regional policymakers. This development marks the recognition that factors determining economic growth of regions (cities) are increasingly intangible, like knowledge creation, institutions and culture, and increasingly mobile, like capital, codified knowledge, and – in part - human capital. It also reflects the awareness that innovation by companies is not a linear process, running from invention and commercialization to market introduction, but a cyclic and interactive process within networks of many different actors. In this view on innovation, emphasis is increasingly put on diversity of networks and on boundary-spanning activity of network actors. Learning in this context not only means to adapt to new circumstances, like a stronger competition, but also to reflect critically on the own institutions and learning processes. In a positive scenario, the networks consist of loosely coupled relations that enable openness and integration, and create perspectives for action. In a negative scenario of “lock-in”, however, networks become conservative and inward-oriented - thereby preventing any learning-based action - or they become subject to confusion leading to high transaction costs and inefficient adaptation (see also Acs et al., 2002; Grabher, 1993). In other words, the quality of the network dynamics strongly matters. The attention for learning regions also reflects the recognition that increasing the innovative level of regional economies is usually a medium- to long-term process, particularly based on the willingness and consensus among regional actors. This has led to policy approaches based on the participation of relevant actors and on holistic perspectives: learning by companies but also by policymaking institutes and other organizations.

One of the first regional scientists who addressed the learning region as a paradigm is Florida (1995). Earlier seminal work underlying the learning regions paradigm was done by Aydalot (1986), Camagni (1991), Maillat (1991), and some others, while the paradigm was fertilized from different angles in regional

studies, like the ones on innovation systems, technology complexes (including knowledge spillover phenomena), Post-Fordism and clusters, and the ones on technology policy, local and regional institutions and community action (e.g. Benner, 2003; Morgan, 1997; Ratti et al., 1997; Cooke, 1998; Maskell and Malmberg, 1999; Van Geenhuizen and Ratti, 2000; Gertler and Wolfe, 2002). The learning regions approach has the advantage over other approaches that it explicitly addresses the quality of policymaking and of other institutional conditions in the regional economy and society. In particular, it is a regional development concept in which the emphasis is put on improving individual and collective learning processes of the regional actors involved through open and flexible networks (OECD, 2001). This concept does not implicate that the learning is exclusively between regional partners. Regional actors like policy institutes and companies learn through both regional (local) and global networks (e.g. Bathelt et al., 2004).

Many governments today deliberately try to enhance high-technology activity in their regions and often embrace the learning regions paradigm to improve policymaking. However, there is a long way to go and the path is littered with stumbling blocks. Barriers in policymaking reside in policy organizations themselves and in the nature of knowledge policies. Evolutionary approaches provide a framework that can be used in clarifying these issues. They allow for an explanation of qualitative change, the rise of radical uncertainty, the role of institutions in reducing uncertainty, variation between organizations and technology, and it provides useful notions for a better understanding of policymaking under such circumstances (Saviotti, 1997; Van den Bergh and Fetchenhauer, 2001); reasons for us to adopt evolutionary thinking in this study. Accordingly our analysis will pay specific attention to various uncertainty in policymaking, caused by e.g. fast changing actor positions and lack of knowledge about causal relations in the field, and to models of governance that fit uncertain situations, different ways of learning adopted by policymakers in dealing with uncertainty and implications of learning outcomes for policies.

Against the above background the paper addresses the following two broad questions from an evolutionary perspective: (1) Which critical conditions are governments facing as a learning organization and which barriers reside particularly in policymaking for the knowledge-economy? (2) What are the needs of small high-technology firms that should be addressed in knowledge policies and which insights are still missing? In answering these questions we make use of an illustrative case study in the Netherlands, i.e. the national policy to enhance new firm formation and survival in biotechnology (Van Geenhuizen, 2003). So far, this policy has lasted for four years and seems quite successful.

2.2 Learning by Policy Organizations

In evolutionary views, it is recognized that rational policymaking is subject to various limitations. First, organizations - be-it governments, companies, non-profit institutions, etc. – suffer from bounded rationality in their adaptation to external change. Bounded rationality rests on the inability of actors to collect all relevant information and to process this information adequately in a decision-making process. Secondly, it is increasingly acknowledged that there is co-evolution of regional (local) governments together with relevant organizations in their territory, companies among others (Van den Bergh and Fetscherin, 2001). Governments and policies change over time in interaction with these organizations. Such a situation of co-evolution makes the design and implementation of policies easier, but it also sets limits to independent policymaking. A third (and related) point is that most learning leads to incremental adjustment of organizations, close to existing paths. Such developments are reinforced by the phenomenon of sunk costs and related increased returns. Thus, once a particular route (investment, strategy or policy) has been taken, it is less likely that alternative routes are adopted later in time, even if these routes are theoretically more attractive. Adjustment is thus path-dependent, eventually causing a situation of lock-in (Grabher, 1993; Arthur, 1994). Only in a few cases, learning leads to the use of untried possibilities and completely novel behavior causing new development trajectories.

Learning is seen as a basic element in evolutionary views on innovation, because it provides the critical input for adaptation of actors and networks to changes in their environment (e.g. Lundvall and Johnson, 1994). Learning can be created using different sources, such as trial and error, borrowing from others (copying), and reflection on own routines, and is in most cases an interactive process with other organizations or networks (Maskell and Malmberg, 1999; Hassink and Lagendijk, 2001). To become effective in learning and not stuck in path-dependency, regional policy organizations and their networks need to satisfy various critical conditions (Table 2.1) (e.g. Senge, 1994; Morgan, 1997; Jin and Stough, 1998). Consensus and commitment are a *conditio sine qua non*. There needs to be a sense of a mission and a sharing of ambitions and visions on the future; these can only be derived from bottom-up (participatory) processes. A related condition is trust between the actors involved. Trust can be seen as the mutual confidence that no party in an exchange will exploit the vulnerability of the other, and as such it facilitates a smooth information flow and all kind of co-operation between network partners, including those that bear risks. Trust is often mentioned together with reciprocity, the latter meaning the mutual understanding that a given action will be returned in kind. Further, a certain level of heterogeneity seems necessary, both in organizations and in their networks. Heterogeneity invites for mutual learning because of differences, and because of an outlook on co-operation and/or competition and synergy.

Table 2.1 Critical Conditions to Enhance Learning

<i>Conditions</i>	<i>Positive impacts</i>
<i>General</i>	
Consensus and commitment	– Enables momentum that allows a community to identify necessary changes and to actually change.
Trust and reciprocity	– Enables information exchange, sharing of resources and risks.
<i>Organizations and Networks</i>	
Heterogeneity	– Enables competition, synergy, etc.
Openness, including reflective openness	– Allows for absorption of new information, particularly to critically view the own performance. – Gives way to creativity, serendipity and sensing power.
Integration	– Interactive learning takes place within and between network. – Problems are viewed through system thinking and analyzed through a rich mix of methodologies.
Demand-driven and action-orientation	– Demands of relevant actors are the basis to achieve new insights and the latter are applied through indications for actions and decisions to be taken.

Source: Adapted from van Geenhuizen and Nijkamp, 2006.

Other conditions that favor learning are openness and integration; these determine the way in which new information is gained, handled and absorbed in the organization, e.g. using system thinking in understanding problems (e.g. Kaufman and Tödtling, 2001) and using critical reflection on the own performance and underlying institutions. An ideal situation that prevents path-dependency is one in which regional (urban) actors are permanently and critically reflecting on their own performance and institutional arrangements, and continuously feed back (forward) to preserve this attitude. Such learning attitude contributes to the capability to absorb shocks (resilience) by the regional economy, like technologies becoming obsolete and organizational failure of large companies dominating the regional economy (e.g. Reggiani and Nijkamp,

2002). This key learning model has also been elaborated by Cooke (1997) as institutional reflexivity, i.e. the capacity of self-monitoring and learning from past successes and failures, required to cope with the need for continuous innovation. It is in-fact a higher order type of learning that is institutionalized and provides critical guidance.

Openness and integration can only be achieved if the learning networks are loosely coupled, meaning that each network actor can adapt to a certain degree without affecting the entire network. It also means the maintenance of different individual capacities in the network, which reinforces the sensing power towards changes in the external environment and potentials to achieve reflective openness and generate novel solutions (e.g. Grabher and Stark, 1997). Integration has two meanings here, i.e. as previously indicated a certain level of co-operation within and between relevant networks of actors, and integrated approaches and methodologies in the analysis of regional-economic problems and in the development of visions (like combinations of econometric modeling and simulations, field experiments and qualitative scenario thinking). A final critical condition in successful learning of policy organizations is to be demand-driven and action-oriented. To prevent non-committal outcomes of learning processes, there needs to be a sufficient match with important demands, aside from a clear explication of implications for future action and ways of decision-making to bring the required policy processes and goals nearer.

Despite all the above insights, the transformation of policy agencies into learning organizations is hampered by a number of serious obstacles in practice. We mention two of them. First, various critical attitudes and activities, like reflective openness and experimentation, do not fit into the current policy culture which is based on goal-efficiency and accountability through quick results. Secondly, qualification of staff and professional level are necessary in triggering changes. Staff members need capabilities (talents) to change their mind-sets and improve e.g. lateral thinking to cross organizational boundaries, signaling of new trends, dealing with uncertainty in creative ways, and acting as a process manager of transition; these capabilities are often scarce. We may conclude that all the above limitations are serious and call for action to structurally change policy organizations.

2.3 Complexity in Policymaking for Knowledge-Based Growth

The ability of policy agencies to respond to the challenge of knowledge-based economic growth is determined not only by their transformation into learning organizations but also by high levels of comprehensiveness and complexity in the subject matter concerned, leading to uncertainty in policy processes and outcomes. Complexity is caused by the unique interplay of a number of factors (Morgan, 1997; Jin and Stough, 1998; Geenhuizen and Nijkamp, 1998, 2000; Benz and Fürst, 2002); these factors will be discussed in this section.

First, we witness a *dynamic multi-actor situation*. The different actors involved include universities and higher educational institutes, research institutes, consultant firms and think tanks, supplier firms, customers, transfer institutes, brokers in network contacts, venture capital firms, and various governments. These actors have diverse and sometimes conflicting interests, whereas some of them perform different roles simultaneously, like universities becoming business-oriented and business becoming active in education in academic fields, thereby blurring the edges between functional areas. The latter phenomenon often occurs through participation in an increasing number of networks to support these different roles (e.g. Etzkovitz, 2002). In addition, there has been a shift from hierarchical, disciplinary and division of labor-based knowledge production to a mode in which research problems are set across disciplinary boundaries (Gibbons et al., 1994; Nowotny et al., 2001). Also, the number of actors from outside universities and established research centers is increasing and they play a growing role in teams (consortia) as a new structure working on a temporary (project) basis. As a consequence of all this, there is a trend for knowledge creation to become more volatile within fast shifting (hybrid) network configurations, and to become more complex. What adds to the above complexity is the influence of fashion and trends. Because solid experience is still missing in the design and implementation of policies for knowledge-based growth, the actors concerned tend to be open to quickly changing and fashionable ideas about what contributes to a learning economy and what hampers such a development.

Complexity in policymaking also follows from the specific local or regional policy (management) framework of learning, because it is *multilevel and multi-sector*. Multilevel means that (policy) decisions are taken at different spatial levels, from local to global, leading for example to decisions at higher levels that influence conditions at lower levels. A specific complication is that two streams of knowledge policies may interfere in a region, i.e. sector policies by national governments causing spatial impacts and spatial policies by local and regional governments. A multi-sector situation means the involvement of different sectors (departments) in policymaking, including e.g. education, housing policy, labor market policy, telecommunication policy, town planning and architecture, and policy for arts and culture. However, policymaking institutes are traditionally organized on a mono-disciplinary basis, such that problem perceptions and frames of reference concerning the learning capability tend to be somewhat biased (or one-sided).

We need also to mention that much remains unknown about the causal relations in the knowledge economy, including effects of policy measures. Developments tend to be non-linear and multi-causal. We will pay extra attention to this in the next section by focussing on high-technology start-ups. A further complicating factor in policymaking is the fact that there is seldom a "*problem owner*" for the task of improving learning capability. Often, there is no clearly defined actor to push the issue of learning into the policy arena in a systematic and coherent way. As a result, a sense of urgency necessary to

activate actors and have them committed to improve the situation is often missing. Moreover, learning policies have a “handicap” in the policy arena because they only yield results in the medium- to long-term. Thus, when seeking support for learning policies, there tends to be competition from those socio-economic policies that yield immediate and visible results, like job creation and physical infrastructure improvement. The absence of a clear problem-owner leads to the need for animators or triggering agents to attract continuous attention to learning, to establish agenda's and to prevent lack of commitment.

Finally, the need for learning and reflexivity calls for a way of associative governance (e.g. Morgan, 2002) which is still facing a shortage of practical experience. In the associative model, governance is based on a mix of public and private roles, with the state establishing basic and broad rules but delegating responsibility for the policy outcomes onto those actors that will enjoy the fruits of success of policies (or negative impacts from failure). This requires to leave traditional command and control modes and to work in a bottom-up manner in relationship with a wide range of associative partners using mechanisms like participation, voice and consultation.

We may conclude that the above situation means that knowledge-based economic policy is forced to deal with quickly changing networks of actors and their hybridization, and to deal with the need for bottom-up processes in determining policies and the need to develop process-oriented policies to create conditions for future developments, rather than goal-oriented policies.

2.4 Basic Needs of High-Technology Start-Ups

High-technology start-ups is the prime category of firms addressed in knowledge policies. In this section we discuss the set of specific needs of these start-ups as apparent from a mix of empirical research (e.g. Druilhe and Garnsey, 2004; Van Geenhuizen, 2003a, 2003b; Nijkamp, 2003; Reid and Garnsey, 1998; Storey, 1994). To this purpose, we adopt a resource-based approach that matches with evolutionary thinking in that an emphasis is put on the different abilities of firms to mobilize resources and on their unique opportunity sets following from different past experiences (see e.g. Lockett and Thompson, 2001). This approach also includes attention for turbulent circumstances in which entrepreneurs need to achieve the right combination of resources and need to take timely decisions on their use, being critical for their growth and jump into next development stage. Another important notion shared by both evolutionary and resource-based approaches is that of heterogeneity. Competitiveness can only be built by entrepreneurs having control over something that is scarce and wanted by others or by entrepreneurs being able to do something that competitors cannot do (e.g. Montgomery, 1995). In addition, most recently attention has been drawn to heterogeneity from a perspective of supporting policies. Small high-technology start-ups are heterogeneous in such a way that policies supporting them need to be

differentiated and customized. It is increasingly recognized that high-technology start-ups vary in opportunities and threats characteristic for the specific sector, like those in software design and biotechnology (the latter including long periods of experimentation without profit and high risks for failure) and opportunities and threats characteristic for specific segments within these sectors, like research companies and service companies (e.g. Audretsch, 2001; BioPartner, 2003). Heterogeneity may also reside in the previous (pre-start) experience of the entrepreneurs, some of them immediately starting after graduation from the university and others starting after a career in a company (Druilhe and Garnsey, 2004).

By nature, high-technology start-ups face a limited availability of resources, connected with their young age, small size and concomitantly, small economies of scale. The latter can be overcome by co-operation with other firms and sharing (exchange) of resources, like in strategic alliances. Table 2.2 displays various needs for resources and potential policy responses to the most problematic ones, to be viewed as a comprehensive list that allows for the above-indicated heterogeneity and customized support. We distinguish between the following critical resources, i.e. information networks, funding and competence, and we will discuss these resources in the remaining section.

With regard to information, high-technology start-ups often face a large uncertainty in dynamic and partly unknown markets and in quickly changing technology areas. Market uncertainty and technology uncertainty cause a need for the latest information and for participation in networks that provide such information. A part of high-technology start-ups develop a product or process on their own (without a customer). For them it is of crucial importance to find customers in time and to be able to enter their market. Learning from mentoring and practical help with market introduction may be beneficial. Funding is a second critical resource. A situation of limited financial means calls for a “protected environment”, like provided in incubators. Funding is often a problem in the pre-start phase (e.g. to prepare a patent application) and in those phases in which the start-ups are expanding and look for new accommodation and for new facilities (e.g. to start small scale production). In the Netherlands, we observe a low preference for the use of venture capital, maybe because it is not well developed, maybe because the conditions for supply are too rigid (or unfriendly).

Competence is the third critical resource to be discussed here; and this one stems from the situation that the entrepreneurs often have a technical background with routines totally different from those required in a business. In technology studies, learning of routines focuses on conducting experiments while excluding uncertainty and risk as much as possible. Being an entrepreneur in high-technology business, however, means to operate in a highly uncertain environment and to take many risks in other areas than experiments. Key skills required for this situation are management skills, skills to

enter the market, for example to interact and convince potential customers, and skills to deal with uncertainty, including sensing power and strategic thinking.

Table 2.2 Basic resources of high-technology start-ups and potential policy response

<i>Resources</i>	<i>Comments</i>	<i>Potential response in supporting policies</i>
General	– Use of scale economies	– Enhance inter-firm networking
Information networks	– Access to specialized information on technology, markets and management models.	– Enhance networking, eventually ICT-based ones.
Funding	– Financial support in seed stage. – Financial support in growth stage. – “Friendly” loans and venture capital. – Support to use advanced research equipment.	– Create a protected environment (incubators). – Help to attract informal capital. – Help to increase supply of seed capital, friendly loans and venture capital. – Organize facility sharing.
Competence	– Management skills. – Marketing skills and skills in negotiation. – Skills in establishing and maintaining networks. – Skills to identify and enter a market (niche). – Skills to handle uncertainty and develop sensing power.	– Promote team starts and participation in courses and customized training. – Organize sector/market niche specific coaching. – Organize personal coaching.

Source: Adapted from Van Geenhuizen and Nijkamp (2006)

The needs addressed above, point to policies that preferably insert high-technology start-ups into networks aimed at information exchange, co-operation, and various training, and that offer them risk-reducing facilities for a limited time, including accommodation, research equipment and soft forms of investment capital. These networks also need to be somewhat heterogeneous to enable the rise of firms that combine unique and scarce resources. What is also important is that the entrepreneurs are able to achieve the right mix of resources in the right time. If sensing power for these critical moments is not sufficiently developed among entrepreneurs and their networks, start-ups may start to follow a chaotic development path and never regain momentum for growth. Note, that the critical combinations of needs for resources vary with the stage in which the start-ups find themselves, i.e. pre-start, start, through-start, etc. (e.g. Reid and Garnsey, 1998; Vohora et al., 2004) calling for a stage-based approach in support policies. However, research aiming at an increase of knowledge about the critical combinations of resources over time, is just beginning. For example, questions on which combinations are most successful in different stages in terms of survival, remain largely unanswered. This is also true for questions about events and developments that may accelerate a positive turn and events and developments that may cause a situation of “lock-in”, and for questions about identification of such events and developments in a pro-active manner. Questions like these call for a systematic, in-depth, research of trajectories of start-up firms to enable the design of adequate stage-based support measures.

In the following sections, the biotechnology policy recently adopted in the Netherlands will be used as an illustrative case study of specific support policies in the realm of knowledge-based economic growth. The rather extreme nature of biotechnology in terms of high risks allows for a clear picture of problems and learning needs faced by different actors.

2.5 *Biotechnology Policy in the Netherlands*

At the end of the 1990s, the national government in The Netherlands realized that the country stayed behind other, relatively small, economies in new firm formation based on biotechnology. This was the more true taking into account that the Netherlands is in the European top of relevant knowledge production, like in molecular biology, genetics, bio-process technology, etc. (Mathiessen and Winkel Schwartz, 1999), and that according to international standards the infrastructure for clinical testing of new medicines is relatively good (MEA, 2000). With 80 entrepreneurial firms in 2000 the Netherlands was behind small economies, like Switzerland and Sweden (Table 2.3). The paradox of an abundant knowledge availability and a modest level of new firm establishment has urged the Netherlands government to design a sector policy supporting the formation and survival of biotechnology firms (MEA, 2000). When considering the number of pipeline products, the Netherlands appears to be even more behind (table 2.3). However, figures on pipeline products are only

available for public companies and these companies are a small minority in the Netherlands.

Table 2.3 Entrepreneurial firms in life-sciences during take-off of the policy (2000)¹

<i>Country</i>	<i>Number of firms</i>	<i>Product pipeline²</i>
Germany	335	6
United Kingdom	265	128
France	180	19
Sweden	165	18
Switzerland	115	20
The Netherlands	80	5
Belgium	65	n.a.
Denmark	60	28
Norway	35	5
Ireland	35	23

Source: ERNST&YOUNG, 2001.

As a first step, an international benchmark study and problem diagnosis were undertaken. Accordingly, by comparing the Netherlands with six regions in the world - the Boston area (US), Cambridge (UK), Quebec (Canada), Munich (Germany), Flanders (Belgium) and Skiruna (Sweden/Denmark) - various shortages could be identified. The diagnosis among others based on this benchmark study can be summarized as follows (MEA, 1999): 1) a shortage of entrepreneurial culture among researchers; 2) a shortage of well-elaborated initiatives for firm foundation forwarded by “driven” persons; 3) a shortage of incubator sites in close proximity of universities, including specific accommodation as well as a supporting infrastructure; 4) a limited availability of seed capital for applied research and specialized venture capital; and 5) an insufficient match between scientific activity and entrepreneurial activity, caused

¹ Entrepreneurial means independently established, thus excluding established subsidiaries. Life-sciences refer predominantly to health sciences, but also to agro-food and general biotechnology (bio-chemicals, bio-materials, equipment and reagents, etc.).

² Limited to public companies. Source: ERNST & YOUNG, 2001.

by missing networks where scientific, business and financial actors meet. The supporting policy, therefore, aimed to improve various underlying entrepreneurial conditions leading to the establishment of around 75 firms in 2000 to 2004 and was granted a total budget of 45 million EURO to enable its implementation. This budget is certainly modest in international terms, but it needs to be noted that the Netherlands is a small-sized country, comparable with some individual biotech regions in the world, like the Greater Boston Area. The policy lines of the so-called Action Plan Life Sciences can be summarized as follows (MEA, 2000):

- To establish a “Life Sciences Platform” to advance entrepreneurship and “connect” new initiatives of scientists, intermediaries, etc. with investors. Activities intend to create networks, awareness, promotion and training. For example, coaching programs and investor networks will be established and a number of chairs at universities will be created to promote life sciences entrepreneurship.
- To develop a “protected” development of start-ups in all stages, i.e. from research including innovative ideas to solid firms with good prospects for survival. Aside from managerial assistance (company trainer), this policy line includes four components:
 1. *A first-stage grant* that stimulates researchers to apply for a patent and to undertake applied research to commercialize an invention; it serves salary needs of the researchers, costs for material expenses and patenting etc., and costs for coaching, with a maximum per project of around 180,000 EURO over two years.
 2. *A supportive accommodation (laboratories and offices) and service environment* in so-called incubators, connected with a *university*; an incubator is established on a public-private basis but needs to be independent after five years; the number of incubators is six.
 3. *A facility sharing fund* for laboratory equipment; this fund enables researchers and entrepreneurs to use very advanced equipment against *market* prices without being exposed to high investment risks; universities or research institutes apply for funding in co-operation with start-ups.

4. *A participation fund* that supplies venture capital on the condition that private parties will also substantially invest (matching funds); the fund of 10,5 million EURO invests up to 225,000 EURO in a life-science start-up.

The above policy is novel in that new firm formation is perceived, first, as a *process* that encompasses different development stages (each with new needs and risks) and, secondly, as a result from *network activity*, including learning. Of course, the establishment of incubators as mentioned in line 2 is not new; it has been an important element in local policy driven by universities and municipalities since the early 1980s; but a new element in the incubator policy is the specific (pro-active) attention for the attraction of candidate start-ups: local university departments will be permanently screened on innovative ideas to generate an ongoing stream of new firms. In addition, it needs to be mentioned that the elaboration and implementation of the Action Plan Life Sciences is in the hands of an intermediary organization (named BioPartner). The board of BioPartner is composed of scientists in the field and representatives of established (large) companies, thus reflecting the use of the associative model of governance. BioPartner provides the first-stage grant, incubator accommodation, facility support and venture capital, and serves as the problem-owner on a practical level.

2.6 Learning Components in Policymaking

The learning components that will be discussed in this section refer to gaining insight into the problems to be solved and into the own performance of BioPartner in the practical elaboration and implementation of the Action Plan Life Sciences. We include a discussion of learning activity that is currently present and learning activity that is considered as (still) missing.

Based on a document analysis we can derive a picture of the learning activity involved (Table 2.4). As indicated above, the initial problem analysis was done by the government, whereas new types of learning activity on the practical level of implementation were initiated by BioPartner. These new types of learning comply with the idea of underpinning knowledge policies by bottom-up action (creation of awareness and commitment) and by a strong use of and participation in networks. This learning activity follows four dimensions, including (1) watching new trends in the sector at large, (2) monitoring outcomes of the own policy instruments, (3) monitoring of the changing structure of the sector, and (4) monitoring and in-depth analysis of the development of new firm establishment and growth in the sector at large, using annual surveys among firms (BIOPARTNER, 2002, 2003, 2004, 2005).

Table 2.4 Learning activity in the context of the Action Plan Life Sciences

Traditional learning (by the national government)

- Initial problem analysis, *inter alia* based on an international benchmark study

New types of learning (by BioPartner)

- Watching new trends in the sector at large, e.g. emerging new technologies, increased merger & acquisition activity and partnerships (alliances), and upcoming hybrid business models and network strategies.
- Monitoring of outcomes of the policy instruments, e.g. the application for access to the funding programs, various network activity, and the attraction of start-ups by the new incubators.
- Monitoring of changing structural characteristics of the new start-ups, like their founding situation, size and business model.
- Monitoring and in-depth analysis of the development characteristics of start-ups and survivors in the sector, e.g. financial performance (like turnover, R&D expenditure, financing), success factors in employment and turnover growth, and the firms' outlook on their future (financial, short term strategy, long term goals).

Source: Adapted from Van Geenhuizen and Nijkamp (2006).

Monitoring of the outcomes of the policy instruments (the second dimension) has led to some early adjustments of the instruments, for example, a broadening of access to the first-stage grant and the introduction of the concept of scouting to the marketing plan; this development indicates the strength of monitoring power and willingness to learn by BioPartner. In detail, the monitoring of financial instruments (Table 2.5) indicates some interesting results on outcomes of these instruments. The success of the applications for funding seems to be much smaller in the venture capital stage compared with the first grant stage (27.9% versus 56.5%). One of the reasons is that an approved venture capital proposal was certainly not a guarantee for success; only about half of the approved proposals (27 out of 50) could gain *matching funds* from private investors, reflecting a continued reluctance of private venture capitalists in the market. Also, the final outcome of the first-stage grant in terms of new firm establishment is rather modest to date: about 10% of the granted projects (5 out of 48 applications). Of course, due to a “delay” of policy impacts more results will become manifest in the near future. Nevertheless, the current situation indicates the impact of various obstacles on start-ups while moving to a successful enterprise, but also reluctance and being “stuck in old paths” of venture capital providers, an issue that remains addressed as a problem by BioPartner. Table 2.5 shows some more monitoring results that illustrate the detail and comprehensiveness of the monitoring activity by BioPartner.

Table 2.5 Some results of monitoring of instruments' outcomes (2004)

<i>Theme</i>	<i>Numbers</i>	<i>Additional information</i>
<i>Instruments' results</i>		
– First-stage fund granted	48 (56.5%) (a)	14 of the 48 granted projects could develop a business plan and 5 new firms could be established.
– Venture capital proposal approved (b)	50 (27.9%) (a)	27 approved applications were successful in finding co-financing (private matching funds).
– Masterclass participants	48	3 Masterclasses “Biobusiness” were organized.
– Firms in the new incubators	45	Average number per incubator: 7.5 (program-based tenants and other tenants).

Note: (a) Within brackets: the share of granted projects in all applications.

(b) Firms may apply without having followed the first-stage funding path.

Source: Adapted from BIOPARTNER (2004).

The results achieved in terms of size of the sector indicate a quite successful performance, despite the fact that the general business and investment climate has declined in the early years of the 2000s, particularly reflected in a strong reluctance among venture capital companies to invest. Note, that we cannot carry out an evaluation in the strict sense, because we don't know how many companies would have been established in a situation without the policy. In the years 2001-2004, through the program and beyond the program, a total of 109 companies have been founded and this number exceeds the target number of 75 start-ups (Table 2.6). This amount reflects an upturn and a break with past patterns. At the end of 2004, there was a stock of 157 entrepreneurial firms in the Netherlands due to an increase by 175% compared with 2000. In addition, during the program, survival among the entrants was quite high (84%), obviously due to the protective environment created by the program just to facilitate the founding process and early growth stage. Note that the increase of the number of entrants could not be coupled with a similar increase of employment and turnover (by 319% versus 112% and 164%, respectively). In other words, the growth of the sector was mainly in the small segment. This observation, together with a net loss of the sector of 75 million Euro in 2004, points to a clear early stage of the sector with highly vulnerable companies. Thus, the Dutch life-science sector today primarily consists of small, loss-making, entrepreneurial companies with fewer than 10 employees.

Table 2.6 Developments of dedicated life-science companies (2000-2004)³

<i>Type of result</i>	<i>Period/Year</i>	<i>Outcome</i>
<i>Companies and employment</i>		
Population	2004	157
Increase of population	2000-2004	+175.4%
Nr of entrants	2004	109 in total (22 on average)
Increase of entrants	2000-2004	+319%
Nr of survivors	End of 2004	92 (84%)
Employment	End of 2004	2.150 fte
Increase of employment	2000 - 2004	+112%
<i>Financial</i>		
Turnover	2004	190 million
Increase of turnover	2001-2004	+164%
Net result	2004	- 75 million
R&D expenditure	2004	118 million
Increase of R&D expenditure	2000-2004	+115%

Source: Adapted from BioPartner (2005).

Aside from the size structure, monitoring by BioPartner also brought to light various changes in business models (Table 2.7). It is important to make a distinction between product and tool (platform) business models and the service business model. Product companies are highly innovative and need a large R&D effort in developing and bringing new drugs or diagnostics to market. Tool companies focus on developing platform technologies, like breeding transgenic animals (mice), and often generate revenues through out-licensing and royalties. By contrast, service companies perform research on contract or offer standard or customized services to product and tool companies. Service companies, by nature, can start generating revenue from the start. Finally, there is also the hybrid company that typically combines activities of two or more of the previous models. Most often, this is concerned with adding “safe” activities such that the innovative R&D can be financed internally, like sales of accepted products from other manufacturers and routine contract research (e.g. Walsh, 1993).

The shift in business models in the Dutch biotechnology between 2000 and 2004 (table 2.7) may be understood in terms of strategies to cope with vulnerability as follows. On the one side, there has been a shift to product

³ In the category of dedicated life-science companies the following company types are excluded: diversified companies; foreign subsidiaries; and consultancy companies.

companies (from 11% to 27%) introducing a higher level of innovativeness and risk compared to service companies; on the other side, there has also been a shift to hybrid companies (from 49% to 57%) as a risk-averse strategy, leading to a majority of companies among the entrants that has adopted such a strategy.

Table 2.7 Developments in size and business models among dedicated life science companies⁴

<i>Type of result</i>	<i>Period/Year</i>	<i>Outcome</i>
<i>Size structure</i>		
<10 fte	} End of 2004	73%
11-25 fte		14%
26-50 fte		6%
>50 fte		7%
Companies >10 fte	2000 versus 2004	65% versus 73%
<i>Business model</i>		
Service company	} End of 2004	8%
Tool company		8%
Product company		27%
Hybrid company		57%
Service company	2000 versus 2004	33% versus 8%
Product company	idem	11% versus 27%
Hybrid company	idem	49% versus 57%

Source: Adapted from BioPartner 2005.

What was not undertaken as a learning exercise is an analysis of potential weaknesses of the policy; in addition, what is missing so far is an updated international benchmark study. These two matters will be discussed in more detail below.

⁴ In the category of dedicated life-science companies the following company types are excluded: diversified companies; foreign subsidiaries; and consultancy companies.

There are four potential weaknesses hidden in the policy and these call for an in-depth monitoring of actual developments:

1. The policy is geared towards “picking the winners”. The start-ups that apply for funding need to be highly innovative and aimed at global markets. This may have two implications. First, the policy tends to be redundant because the highly innovative start-ups selected are winners anyway. Secondly, a substantial part of biotechnology firms - with a more modest profile, aimed at the national (EU) market and involved in less risk-taking activity – is not affected by the policy. There was an opportunity here to differentiate in type of support between the highly innovative start-ups and the ones with a more modest profile.
2. The policy tends to miss a chance for creating critical mass. Six separate incubators spread over the country may not be able to create the critical mass needed in a strongly competitive market and may even cause duplication between regions. In a situation of e.g. three incubators and a strong technology focus of each of them, critical mass may be more easily achieved whereas competitive power and the image towards foreign biotechnology actors may be stronger.
3. *Success of the policy depends to a certain degree on more general institutional conditions and actors that are beyond control.* Particular circumstances, like a general worsening of the business climate and a modest entrepreneurial culture in the Netherlands including unnecessary constraints from regulation (e.g. high costs of establishing a limited liability company, and prohibition of particular biological experiments) have a negative influence on new firm establishment in biotechnology. The entrepreneurial culture in the Netherlands is currently being improved, such as by simplifying rules and laws concerning new firm formation, the cost level, etc. (MEA, 2001). However, path-dependency among labor unions, university boards, investment banks, students as potential entrepreneurs, etc. cannot be changed overnight. In terms of institutional transformation, the biotechnology policy seems successful in having established the

necessary networks supporting entrepreneurship among academics, but it remains questionable whether there has been any transformation in institutions connected with venture capital affecting later stages of growth (if possible at all).

4. *The policy contributes to an increased entrepreneurial activity and a larger economic use of academic knowledge but leads to an extremely large segment of small and vulnerable companies that need to proof viability in the next coming years.* Thus, it is uncertain whether The Netherlands will be able to capture the full benefit of the recent developments and whether the sector is able to move to a mature stage including a significant number of medium-sized and large biotechnology companies. Without a supportive policy for later stages, a shakeout may occur among the small and vulnerable companies.

Missing in a learning strategy frame is a new benchmark study or a comparative analysis including biotechnology regions abroad, but it is maybe too early after four years of policy implementation. In general, it seems wise to compare the policy packages and types of start-up processes and survival in the Netherlands with different foreign regions. Accordingly, questions can be addressed about financial support, time-horizon, comprehensiveness of policy packages, e.g. direct and indirect (process) measures, types of start-ups (technology), and failure in a cross-comparative analysis. Note also that reflective learning is not strongly developed to date, but this is connected with the very young age of BioPartner as an organization.

It needs to be mentioned that in general, practices used in the evaluation of knowledge policies are subject to change (e.g. Kuhlman, 2003). First, it is recognised that evaluation takes place in a multi-actor (interest) situation in which ideas about what should be evaluated and how, as well as the interpretation of the results may differ between actors. Accordingly, evaluation requires the involvement of the different actors to a certain extent. Secondly, policy processes bringing the achievement of goals nearer are as important in evaluation as goals achieved. This connects with the evolving purposes of many knowledge policy programs. Thirdly, it is recognised that there is often no linear causal relation between policies and perceived results, but non-linearity and multi-causality. Considerations like these have already led to the introduction of new procedures and content of policy evaluation. Behavioral and process-oriented criteria are added, like in the European regional RTP/RIS exercises (Landabaso and Mouton, 2005).

2.7 Concluding Remarks

In an evolutionary interpretation of regional and national economic growth, there is an increased attention for the quality of policymaking, particularly for learning. By nature, governments suffer from bounded rationality, limits in independent policymaking due to co-evolution, and a natural trend to respond to external changes through incremental adjustment. This situation may lead to path-dependent behavior and even lock-in, hampering the transition to a knowledge-based economy and society. Reflective openness appears to be the most important condition for such a transition, i.e. the ability of self-monitoring, including a critical questioning of values and institutions underlying the own performance. However, to achieve such learning by government organizations is far from easy, because current pressures from goal efficiency and accountability do not match with such transformation.

The case study documented above is concerned with the national policy on new firm formation in biotechnology in The Netherlands, the Action Plan Life Sciences. It demonstrates the rise of new approaches fitting the needs of start-ups from a development (stage) perspective and satisfying the requirement of steering on new processes as institutional conditions for new firm formation, based on the associative model. These are important steps. The case study also demonstrates strong elements of a learning strategy. Learning by the organization that implements the policy includes a watching of general trends (including the sector) and monitoring of the outcomes of own procedures and measures. However, missing elements include a critical reflection on the issues of “picking the winners”, missing the opportunity of creating more critical mass, limits from the general entrepreneurial environment, and a reflection on the result of having contributed to a large segment of small and vulnerable companies for which a jump into next growth stages is highly uncertain, potentially indicating a situation of lock-in. At the same time, it must be admitted that the policy is still very young and that such learning may be developed in the near future. A general question that has not been addressed in this study but needs ongoing policy attention is to what extent support to high-risk companies can be extended in time and protection be continued without “violating” the principle of competition and creative destruction.

The extras that an evolutionary perspective provides in policy analysis, are summarized below, on the basis of our case study experience. In general, an evolutionary view places a policy in a long-term development framework and a framework of dynamic change. The first draws attention to path dependency (and lock-in) and necessary institutional transformation, and the second draws attention to the rise of manifold complexity that asks for new learning approaches. In addition, it addresses holistic insights into behavioral aspects of both policymaking agencies and actors that are subject to the policies, calling for particular governance models and ways of learning to adapt ongoing policies. The need for attention to heterogeneity among companies and to customize policy measures accordingly, is a further insight derived from

evolutionary approaches. Thus, adopting an evolutionary perspective in policy analysis creates an important awareness on how well policies match with situations of long-term development and dynamic (and uncertain) change. In such a context, various research paths can be identified to support learning regions' policies, like a systematic in-depth-analysis of development trajectories of high-technology start-ups over different sectors and segments within sectors, and of similar sectors across different countries revealing a potential influence of different growth stages of high-technology sectors and of different institutional environments. Needless, to say that there is an interesting mix of research ahead of us.

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3

Theory of Learning Regions from an Subjective View

Lumír Kulhánek, Silesian University, School of Business
Administration in Karviná

3.1 Introduction

The objective of the proposed study is to provide a subjective view on the theory of learning regions in terms of perception of this theory and its acceptability on the present. Some recommendations that this theory has brought are presented and how their applications are currently regarded. In this way, we can find an answer for the question, if it is possible to use a theoretical base of the learning regions theory in the field of a regional policy. Regional programming and projects are explored as well.

3.2 Conception of the learning regions theory and its basic axioms

Research on regional growth and development factors encompasses plenty of fields and different approaches which are the subject to frequent changes over time. Currently many authors accentuate, besides traditional factors, factors such as externalities, non-market trade-offs, networks, social capital.⁵ Analyses of regional development and studies of regional politics are aimed at innovations that many authors consider to be regionally tied processes.

The growing interest in economic and regional development research on problems of agglomerations, role of technologies, new learning regions, new industrial space, has been observed since the 1980s.⁶ In the first half of the nineties, research was stimulated by the cognition that knowledge and human capital are, in new conditions, necessary to be considered as essential for the general success in the “new” economy (see Feldman, 1994)⁷, and “knowledge economy” or “learning regions” have become the interest of many significant institutions.⁸

In terms of development of economic theory and regional policy it is particularly important that alternative ways of development in research and analysis have been re-admitted (in contrast with the “path dependence”). The

⁵ The survey is mentioned for example by Malmberg (1996, 1997) or Malmberg and Maskell (2002).

⁶ In terms of the theory of learning regions, B.A. Lundvall (1992), A. Saxenian (1991), M.P. Feldman, R. Florida (1994) are the most frequently assigned to be the main representatives.

⁷ Before Feldman see e.g. Toedtling (1991) nebo Storper (1993)

⁸ See for example title of the OECD publication (2001).

lack of an all-economic understanding of regional and local development has been accepted as well. Also the role of social dynamism and institutional structures within the creation of regional or local systems has been further admitted. However, it is understandable that the authors emphasise various aspects of development and their clarifying is different in details.

The remarkable interest in research on the role of innovations and innovation systems, which had already been introduced by Lundvall (1992) at the national level, has essentially been expressed by application of two approaches – the approach regarding national or regional innovation systems and the approach based on the process of the clusters development.⁹ In both approaches, it is possible to regard tendencies of orientation rather than the description role. Whereas the first research work was more oriented on searching for the relation between the process of globalisation and the ability of the national economics to influence their own national technical sovereignty, later on the research work was aimed at the question of how the innovation abilities are maintained through the regional communities of enterprises and the supportive networks of institutions participating in a common knowledge base. These studies reflect innovation to be a fundamental geographic process (Saxenian, 1994).¹⁰ The competitive advantage of the region is not limited by gain of the codified knowledge and capital available worldwide, but depends on the institutional and social capital supporting taking-over and improvement of “written” and “unwritten” knowledge.

Theory of learning regions is rated among contemporaneous theories of regional development that have been formed over the last decades of the 20th century. Most of these theories consider divergence to be a principal tendency of regional development. The theory finds causes of the interregional divergence in different cultural frames for the organization of production and for enterprises’ behaviour (theory of production district, theory of flexible specialization), or in socio-cultural and institutional differences (theory of learning regions). As, for instance, Blažek (1999) refers, similarity of basic aspects of these theories is so high that some authors do not even distinguish between them.

Also Mariussen and Asheim (2003) talk about group or a set of theories and indicate it as F2F theory (face-to-face theory). For this theory, or the particular approaches included, it is congruent that they emphasise “proximity, clusters, and innovations”. For its origination, both economic geographers, and evolution economists and other social science representatives are responsible. Since the nineties the theory has been further developed by many economists¹¹ and their

⁹ The first approach is represented particularly by publications of members of “Innovations Systems research Network” or by some EU publication. The second one is represented for instance by Nordicity Group for the National Research Council.

¹⁰ On present, the author analyses regional advantage in global economy, including developing countries. See Saxenian (2006).

¹¹ Amin (1994), Asheim (1996, 2000), Cooke (1998, 2001), Gertler (2001), Lundvall (1992), Malmberg and Maskell (1998, 2001), Porter (1990, 1998), Scott (2000) Storper (1997) and others.

results are promoted by OECD and EU as recommendations for the innovation policy and regional policy.

Using the institutional approach within the F2F theory, the accent is put particularly on the relations structure between various forms of institutionally conditioned and imbedded knowledge. Regionalists aim their attention then at the specific process realized at the microeconomic level. Its individual links and premises mutually concur according to the schema:

- Agglomerations provide proximity,
- Proximity gives the possibility of F2F interaction,
- Interaction F2F generates interactive learning,
- Interactive learning leads to innovations,
- Innovations boost competitiveness,
- Competitiveness enhances agglomeration,
- Spiral accelerates, deepens and broadens.

The conception of learning regions was made by R. Florida (1998) and by the other authors emphasising the significance of research and development, creating knowledge and innovations as driving forces of territorial competitiveness. Increases in regional competitiveness and prosperity through the improvement of the qualification level of various regional organizations (subjects) and through the creation of their cooperative behaviour model are the general objectives of the learning regions development.

The gist of the theory of learning regions is represented by the hypothesis that competitiveness is based on better learning ability; therefore the socio-cultural and institutional differences are the cause of interregional differences. The main agglomeration mechanisms are considered to be of a particularly strong ability of knowledge accumulation in the region as well as the creation of conditions for a generation of the new ones (Malmberg, Solvell and Zander, 1996). Agglomeration advantages are not understood more fully in the close economic sense (specialization economies, transactions cost economies) but are like agglomeration advantages in the socio-cultural field.¹²

The conception of learning regions could be considered as the doctrine of regional development, in which the most important measures are verged to development of human capital and support of networking (trust network based on intensive contacts coordinating cooperation) in regions and between regions. That is why the conception is attractive for regional policy or regional programme makers.

¹² See also analysis of Saxenian (1991, 2006).

Theory of learning regions sees the main mechanisms of further development in existence of positive feedbacks in the field of learning, taking-over new technologies and processes, market and non-market change of information and in existence of technological infrastructure. Enterprises, institutions and regional innovation systems are the main subjects. Regional policy, in this conception, should promote regional innovation systems (development of relations between schools, local government and enterprises). But it is necessary to warn against close understanding of learning regions characterizing learning region as a region with wide activities in turn to continuing of education or lifelong education, as well as against the conception characterizing a learning region by wide activities in turn to the strengthening and networking of educational capacities of the region. These conceptions, in principle, generalize only some parts. We guess that the learning region is possible to characterize more appropriately as a persisting and continuous investment leading to the integration of all regional subsystems and institutions into the scheme of a long-functioning process of mutual learning and innovations. This conception also warns against single overestimation of some parts or subsystems, or on the other side their underestimation which could arise while conceiving a strategy of learning regions.¹³

Critique of the theory of learning regions is aimed at overemphasizing the significance of local relations and geographical proximity. The main reason for the creation of the confluence of dynamic subjects do not have to be the need of their mutual relations but the use of specific regional resources of high socio-cultural quality (traditions, enthusiasm, positive expectation, individual motivation, common vision, emphatic persons). Just these characteristics keep on, despite of the conditions of the high mobility of information, capital and persons, to a great extent as immobile. In our opinion the creation of the networks could not be limited to self-contained inner networks, and it is necessary to give attention to relations between regional system and outside environment besides the relations within the regional system.

3.3 Key processes of the learning regions

Key processes of the learning regions can be divided into 3 categories:

1. The first item of the learning regions concept is to generate and improve the level of know-how at the individual, organisational and regional level (according to OECD, 2001 – generation of human capital – individual know-how, structural capital – organisational know-how, social capital – communal know-how). The creation of new human capital has a significant role in the innovation processes, and it is also closely connected with the

¹³ Mentioned conception is close to the conception of learning organizations or subjects and the conception of social capital. It is usable also while developing of regional management (regional governance) at the operative, strategic, organization and symbolic level, though which is not the subject of this study.

process of learning that could be realized through the new technologic and scientific innovations.

2. The cooperation between regional subjects and diffusion of human capital and know-how in organizations and between organizations represent the second item of the learning regions conception. This could be considered as the opportunity for achievement of agglomeration advantages.
3. The transfer of human capital and the new know-how into practice is the third (and probably the most important) item of the learning regions concept. In terms of the regional output or economy it means growth of GDP and employment, a higher quality of services and welfare in the region.

The definition of these three key processes results from the understanding, that in present economics, frequently designated as the Knowledge Economy or even The New Learning Economy, knowledge is the central item of production and the crucial input for the competitive economic activities and the creation of economic growth (compare e.g. OECD 2001, Malmberg and Maskell, 1999). However, it is evident that even the most specialized forms of knowledge are becoming to be resources with a short life-time. That is why the ability of continuous learning and adaptation to quickly changing conditions determines the efficiency of enterprises, regions and whole countries (Lundvall and Borras, 1998). Success in competition depends particularly on the ability to generate knowledge, on knowledge diffusion and on using within the production of goods and services (Morgan 1997, OECD 2001, Wolfe 2002).

3.4 Principles of the regional policy

The conceiving of an adequate regional policy and preparation of local or regional strategies require the knowledge of regional development theories which explain and assess the basic factors of regional development, its subjects and mechanisms. There is a wide range of these theories although their initial principles are frequently contradictory.

From the conclusions of the OECD study "Cities and Regions in the New Learning Economy", it is obvious that simplified copying of strategy or policy of successfully developing regions and their implementation in other regions does not have to necessarily lead to a prosperous development in these regions as well.¹⁴ Then following the experience and inspiration from the other regions can be useful; however, they are not a guarantee for success. On the other hand it is necessary, while making a regional policy, to apply some principles given by transition from a classic economy to a knowledge economy (economy based on knowledge).

Principles of learning regions creation policy comprise both the mechanisms of the learning process and the necessary inputs for the learning process. Considering the learning process mechanisms, extra attention has to be given partly to the coordination of separate industrial developing process, research

¹⁴ See e.g. OECD (2001, 121).

and development, science and technology, learning and further education, and also partly to the coordination of managing at the regional, national and transnational level. Furthermore, there is a need to work out the preparation strategy of appropriate forms of social capital. Continuously to assess the relations between participation in individual learning, innovations and changes on the labour market, is necessary as well. Assuring the acceptance of a regional learning strategy by the regional population and its practical transformation has its unfungible place between the mechanisms of the learning process.

Learning process inputs especially encompass providing the high-quality education which can further develop an individual's life-long learning. Furthermore it is necessary to coordinate offer and demand of jobs in a region through the education and training, to establish appropriate frame conditions for improving the organisation learning (in enterprises as well as between them and other organizations) in the interactive networks, and to ensure effective organisation learning not only for the fields (especially high-tech ones) chosen in advance but for all the fields of production and services which have the potential for higher level innovation capacity in the region. Present research works, financed also by the European Union, show how the highly specialized forms of knowledge can be the source of a short lifetime as a consequence of accelerating changes of a global economy. Therefore, only in an economy based on knowledge or in learning economies, the ability of continuous learning and adaptation to quickly changing conditions is emphasised because only these influence innovation efficiency, including efficiency at the level of regions (Florida 1995, Morgan 1997, Asheim 1998, Asheim 2003).¹⁵

Besides the already mentioned learning process inputs, it is necessary to identify the extent of actually disposable resources which make barriers for further economic development of the region, and the extent of resources which can contribute while developing an innovations strategy in the future (the concept of resources is wide here, from the existing fields in a regional economy, through to the education and research, up to the positive social capital). Learning process inputs have to positively react on rising economic and social conditions as well. The application of general principles in the regional policy (i. e. mentioned inputs and mechanisms of learning process) always requires to take into account the specific situation of the region.

3.5 Conception of learning region as a regional development doctrine

Considering the above mentioned key processes of learning regions, we have to submit that they have some points of concurrence and that some of their parts overlap. Human capital generation usually consists of the transfer of

¹⁵ Other approach is based on studies about processes of clusters development (e.g. Porter 1998, 1999, 2000). There are plenty of factors defined which contribute to complex of institutions and individual subjects forming innovation system or cluster to stimulate innovation process and economic growth. Just Porter finally reworded his cluster approach toward the regional innovation systems in 1998.

know-how and knowledge realisation. Organization networks produce the new know-how and also are oriented to the realisation of pieces of knowledge. Finitely the realization of knowledge requires human capital generation and know-how diffusion. Regional development strategy has to ensure job placements and incomes. If it does not ensure them in the long term, the basis for its implementation would be weakened. The learning region conception as a doctrine of regional development therefore has to press for an overall development of operative environment and continuous adaptation of changing conditions. Supposing the main function of the public sector is to increase the ability of the economy to cope with changes, it is possible to consider the general principles of the EU structural funds (contribute to long-term sustainable development of economic activities and employment and human resources).¹⁶

3.6 Conclusion

Learning regions theory can be considered at the present as one of the concepts while searching new ways or lines for completing development of regions. Its use requires connection of sub-elements and systems “policy”, “administration”, “public” and “economics” with networks in the region, and establishes mutual trust and space for joint action. Currently, there is a need to ensure their relations to the external environment and adaptability to changes through a widely conceived learning process.

In the theoretical light, it does not concern, in case of learning regions theory, the integrated and comprehensive theory in the sense of economic theory but rather the composition of various approaches which are consolidated on the basis of some pieces of knowledge (process of interactive learning, networks, innovations). Development of this theory has not been half finished yet and the theory is able to incorporate other new knowledge. Therefore the connection of aspects of various theories will be further shown in its development; eventually its piece of knowledge will be used in the other learning theories of spatial or economic subsystems.

In terms of development of learning regions in the Czech Republic, it is necessary to follow further the development of this theory or similar modifications on one hand and study the knowledge from its practical application of learning regions theory in foreign countries on the other hand. There is a sure offer to follow (not only mechanical copying) the experience of neighbouring countries (Austria, Germany), Scandinavian countries with highly developed and changing regional policy but also other OECD countries, and even the newly developing countries of Asia.

The theoretical base should be, in our opinion, improved with some aspects of management and control theory, regional governance and theory of learning. From the practical point of view, it is possible to use, though pragmatically,

¹⁶ It is necessary to follow priorities of intervention objectives from EU structural funds.

resources provided by the European Union to ensure the competitiveness of regions as the learning regions.

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4

Learning Regions in Theory and in Regional Development Policy

Andrzej Klasik, University of Economics in Katowice

Florian Kuźnik, University of Economics in Katowice

4.1 Concept of the learning region

A learning region can be defined in many ways. Essentially, one can look at it from four different perspectives: from the point of view of coherence, capital, adaptation and the future.

From the point of view of coherence, the learning region is an area of knowledge, experience and competences acquired and used in the process and in the policy of creation. In addition, the increase, as well as mitigation and elimination of differences between specific sub regions that is or may be directly related to the region's development as an economically, socially, and spatially coherent area.

From the point of view of capital, the learning region is an area of knowledge, experience and competences created, acquired and developed in an individual and intergenerational, as well as organisational and inter-organisational dimension, with a perspective of creating human, organisational, social and cultural capital in the future.

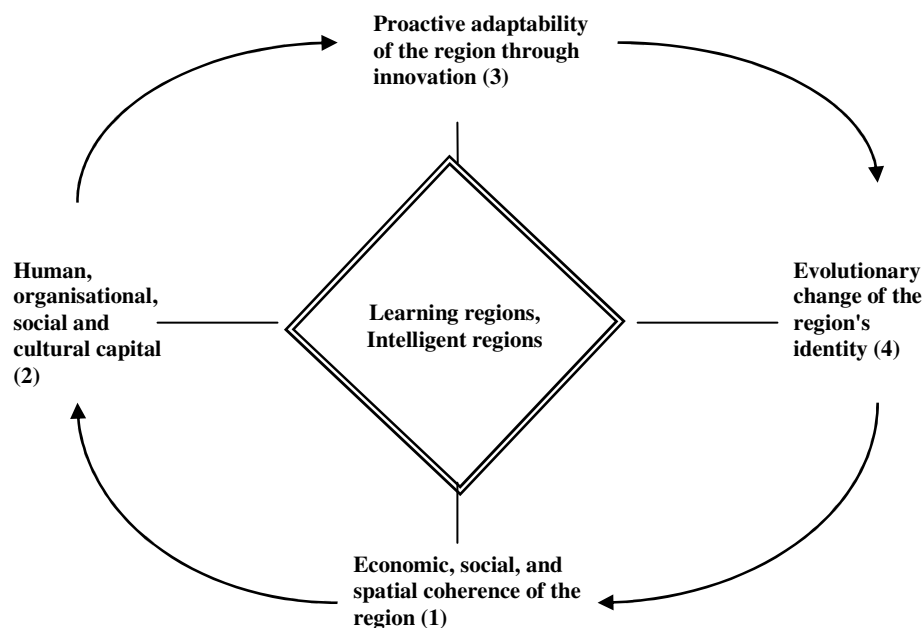
From the point of view of adaptation, the learning region is an area of knowledge, experience, and competences acquired and assimilated in the process of proactive behaviour of the region towards its environment. In addition, adapting to the changes in the surrounding area by means of innovations, under the influence of events, phenomena and tendencies that occur or may occur in neighbouring areas or beyond, as well as in the national, European and global context.

From the point of view of the future, the learning region is the area of knowledge, of experience and competences shaped in the process and under the influence of strategic changes taking place in the region, changes that are monitored and evaluated taking into account the desired future of the region, its evolutionary identity, and in particular such aspects of the region's identity as local specialities. The behaviour of types of actors on the regional scene; as well as, the continuing mentality and the strategic concepts despite the changing regional leadership.

Learning regions multiply and enrich their knowledge and culture, as well as their competences and infrastructure. Building on them, they maintain, develop, and strengthen the four main strategic capabilities (figure 4.1):

- the ability to keep and strengthen economic, social and spatial coherence,
- the ability to create and develop human, organisational, social and cultural capital and to put them at the service of regional development,
- the ability to adapt proactively through innovation, faced with a fast changing environment, including the global context,
- the ability to change the region's identity by evolution under the impact of the strategic change taking place with regard to specialised activities, established behaviour types of actors on the regional scene and the change in leadership structures taking place as a result of elections.

Figure 4.1 Perspectives of the learning region



Source: authors

Regions that maintain and develop the capabilities listed above deserve the name of intelligent areas. At a higher level, intelligent regions and cities are areas and centres, which represent the poles of knowledge and competence, mostly based on human capital.

In learning regions, what comes first is a transmission of knowledge, experience, and skills between generations, making it possible to maintain social and cultural coherence. The social and cultural perspective, which influences the time of existence of the region, should perhaps be reinforced by a regional policy of coherence implemented by the public authorities. If they pay attention to economic, social and spatial coherence, it means that convergence processes are supported in the regions in relation to creating added value, on the labour market, as well as in the relations between the centre and the periphery in terms of concentration and spatial availability. Learning regions are subject to the phenomenon of concentration and dispersion, to attracting and repelling forces, as well as to a process of assimilation and diversification. The past, future and present exist integrally within the learning region.

The region is a learning area because of the functioning and development of research and educational systems. The creation and assimilation of new knowledge in the region takes place at an individual level by means of interpersonal communication, at an organisational level by means of team action and at an inter-organisational level between companies and institutions by means of partner co-operation using new communication and information technologies, as well as by networking and clustering of companies and institutions. The region is a learning area as it creates, develops, and manages interdisciplinary and multidisciplinary projects and research teams, using interactive systems and educational programmes based on advanced research and an educational infrastructure. Shaping creative and co-operative attitudes contributes to the building of the region's future, creating new values and to generating the internal and external development of the region. Development is based on an endogenous potential that involves the human, organisational, social and cultural capital. If these capitals are renewed and multiplied, they constitute the driving forces of the region. They determine the uniqueness of the products and services offered in the area. Research and education that contribute to the region's development point to the importance and to the mission of universities and other higher education institutions in the region.

The region is an area that learns by being open to its environment and by interacting with it. Currently, this regards the global context in particular. The learning region maintains a proactive capability of adapting to the civilisation and cultural challenges faced by the modern world. Whether the region has the ability to adapt proactively to the changes that take place on a global scale and therefore to participate in these changes, depends on the endogenous potential and on research and development activities, as well as on the international mobility of human capital and its capability of communicating between cultures. It depends, however, primarily on the ability of the regional elites and leaders in

the field of culture, science, business, politics, and media to perceive, evaluate and benefit from the development opportunities, which may be brought by global events, phenomena and tendencies. In the national and European context, the learning region is characterised by keeping the regional community and economy based on assimilating various achievements and best practices. This involves the overlapping of two general tendencies within the region. One tendency involves imitation, disiformisation and convergence. The other tendency involves the strengthening and enriching of the region's individuality, specificity, and uniqueness. The evolutionary change of the region's identity related to a strategic change is based on the fading of some and the emerging of other regional specialities. What frequently changes in a learning region are also the attitudes and behaviour of people and communities, companies and institutions, as well as whole sectors. Finally, because of democratic procedures, regional leaders are elected and change. The system of forces on the regional scene also changes. The assumption related to the evolutionary change of the region's identity is that continuity of strategic thinking will be maintained in the area in the face of all the changes taking place.

The concept of a learning region with all the perspectives, capabilities and contexts mentioned above, its quick development and diffusion, its key importance for retrospective and prospective thinking about the region's future, for its internal and external development, its capacities and its strict relationship with the building of a knowledge-based economy and an information society allow us to conclude that a new, concise concept of regional development is emerging. A new paradigm of the regional development theory is being created. In the light of the learning region paradigm, past and contemporary theories of regional development need thorough reevaluation. The idea of a learning region seems a new concept belonging to "regional science" in the context of globalisation processes. The concept is situated at the centre of the mechanism of building intelligent regions.

4.2 The region's learning as a part of regional development

In a knowledge-based economy, issues related to learning, innovation and intelligence refer not only to companies and public institutions, but also to areas. One can assume that various learning processes take place in such a specific area as the region, both in the individual and the institutional dimension.

Individual learning involves assimilating knowledge and skills by individuals. There is a formal and informal dimension to this. Individual learning involves learning processes that are continuous in the sense of providing knowledge throughout the period of life, as well as permanent, irreversibly contributing to the increase of individual competences and to the assimilation of new ones.

The institutional dimension of learning is related both to formal organisations, such as enterprises, and to more or less formalised organisational structures such as networks, conventions and forums. In the

case of strong formal organisations, a separate category of the learning organisation can be observed. Such organisations are themselves factors that strengthen the regions where they are located. Very often, however, they are structures of over regional importance. The region is not their proper area of activity. As far as loose organisational structures are concerned, learning processes usually take shape within the region. The region in general or a certain kind of area, such as for instance a metropolitan one, appears as a value in itself. Without it, there would be no intense, quick and efficient learning processes. In other words, there would be no processes leading to a knowledge-based economy.

To understand the concept of a learning region, one has to take into account the collective learning processes, characterised by categories such as networks and partnerships. Collective (group) learning may be treated as a higher level of learning or as a kind of synthesis (also territorial) of individual learning. Collective learning may take place when individuals and organisations have many possibilities of communicating, obtaining information, and exchanging experiences. The network category gives the sense of learning by exchange very well. Such characteristic features of the network as the possibility of belonging to many networks, easy access, and quick creation of new networks are all factors, which facilitate communication, information exchange, as well as comparing one's own knowledge and skills with others. The network's functioning is based on partnership. Hierarchical networks are usually just a small part of the whole networking process.

Partnership is the essence of network systems. In the case of learning regions, it is also significant because of the participation of institutions belonging to various areas, such as the public, private, and civil sector, to various authorities, as well as of natural persons that do not want to be petitioners, and who enforce their right of access to information and knowledge in networks. Public-public or public-private partnerships may be created by means of bilateral agreements. A higher level of multilateral partnership is only possible in network systems.

The intensity of network systems in a region, the number of networks, their penetrability, the use they make of the region's resources and their focus on the region make it possible to point to the existence of a specific environment or environments within the region. The environment category gives the sense of mature functioning of network systems. The innovative environment category is the one that is the best defined and diagnosed in the sources. The concept of an innovative environment lies at a higher level than the one of a learning environment or of an environment where learning takes place. Innovative environments are based on learning processes. A learning environment can be defined by such features as positive attitude towards knowledge, trust in educational institutions, encouragement of investment in personal development, presentation of best practices, promotion of new values etc. The environment's

features shown here, as examples are actually ones that characterise the social capital of a region.

The region's learning processes are regulated by four mechanisms that show the ability to use the region's competences collectively (table 4.1):

- Mechanism of internal social, economic and spatial integration of the region,
- Mechanism of capital synergy in the region,
- Mechanism of interactions generating innovation,
- Mechanism of regional self-organisation.

These mechanisms define the four levels of learning for a region.

Table 4.1 Multi-level learning of a region

<i>Level IV</i>
<i>Mechanism of regional self-organisation</i>
Regional system of sustainable strategic change
<i>Level III</i>
<i>Mechanism of interactions generating innovation</i>
Regional system of generating innovation
<i>Level II</i>
<i>Mechanism of capital synergy in the region</i>
Regional system of creating knowledge and competences
<i>Level I</i>
<i>Mechanism of internal social, economic and spatial integration</i>
Regional system of transmitting knowledge, experience and competences

Source: authors

The first mechanism is that of internal social, economic, and territorial integration. It shows the region's capability that consists in ensuring:

- smooth information flow within the region and in its relations with the surrounding area
- contacts between people, generations and organisations in intra- and interregional relations

- transmitting and memorising all that constitutes permanent knowledge, experience and competence of a region

The mechanism of internal integration of a region defines the first level of learning. The region's learning at the first level starts with the traditional transmission of knowledge, experience, and professional competences, which is community-based, as it takes place within the family, at crafts workshops or industrial plants, at offices and institutions, associations, local communities etc. Community transfer also relates to connections between various organisations. Connections between individuals and organisations are facilitated by the vicinity and the intensity of contacts that derive from functioning in the same area.

Traditional community learning means a permanent transfer of knowledge, experience and professional competences between generations and organisations. The strength of such learning is because the region uses its cultural heritage in a practical and creative manner for its development, keeping, and passing on to the future that which made it successful in the past. Traditional learning has a basic weakness, however, that consists in the region's tendency to close itself to the outside world. New values are only created using one's own forces.

The learning process requires the region to open itself to the surrounding environment. In the extreme case, the opposite of traditional learning would be situational, "modern" learning, i.e. learning that breaks with tradition and cultural heritage and refers only to the achievements of the surrounding areas. The essence of a region's learning at the first level regulated by the mechanism of internal integration is the combination of traditional learning and the continuity of knowledge transmitted between generations and organisations with learning based on being constantly open to the environment and attracting creative individuals and organisations to the region. Learning in this sense ensures that new knowledge and professional competences appear in the region. The first level of a region's learning may be defined as a regional system of transmitting knowledge, experiences, and competences.

The capital synergy mechanism reflects the capability of using all the capitals that are available to the region in the learning process:

- cultural capital – resources of material and spiritual culture, including education and science,
- human capital – the intellectual and moral level of people and communities, their level of education and their qualifications, including the ability to co-operate,
- organisational capital – knowledge and skills, as well as organisational culture in the intra- and inter-organisational dimension,

- social capital – ethos, trust, social rules of co-operation that strengthen integration processes.

Cultural capital and human capital are resource-based. This means that they involve collected intellectual and material property. Organisational and social capital is relational. They represent a certain positive type of organisational and social relations that favour co-operation and constitute a source of new values.

The region's learning at the second level, using the capital synergy mechanism, means entering the processes of creating new knowledge and professional competences and making creative use of new experiences, as well as of all the capitals that are available, in a way that ensures their supplementation and strengthening. In this sense, one should speak of capital synergy and not treat various types of capital separately. The synergy effect will appear in the form of new values when universities, other higher education institutions, and various research and development bodies will create a regional system of learning and education combined with the potential and the needs of the community and of the regional economy, as well as of organisations from the public, private, and civil sector.

One can speak of capital synergy in a region when various intermediary entities appear between the basic learning institutions mentioned above, with the mission to commercialise technology, limit the risk of investing in innovation, convince and raise social awareness, promote novelties, etc. and if the legal/administrative, financial and organisational mechanisms that favour co-operation in conditions of fair competition work well. The second level of a region's learning can be defined as a regional system of creating knowledge, experiences and competences.

The mechanism of interactions generating innovation shows the region's skills with regard to the efficiency and to the effectiveness of making multidimensional use of new knowledge, skills, and competences. This practical approach to learning marks the passage from knowledge and skills to innovations generated at companies, public sector institutions, and households. The two first levels of a region's learning could rely on the ability to make creative use of the innovations created in the surrounding environment. One also needs knowledge, skills, and professional competences to lead dialogue with the environment.

The third level of a region's learning involves a reversal of the relations. Firstly, the point is to create innovations within the framework of regional innovation systems that support regional development processes. These involve technological, organisational, as well as social innovations. Learning takes place through locally created innovations.

The learning region can access the third level of learning if the following conditions are met:

- the region is open to the outside world and there are many interactions with the environment, which results in a bidirectional flow of knowledge between the region and its environment
- the region becomes attractive and hospitable for creative individuals and innovative entities,
- the entities that operate in the region are capable of concluding strategic alliances within the region and externally.

The region's passage to the third level of learning means that a regional system of generating and implementing innovations exists. As a result, this means having permanently achieved a high competitive position within a knowledge-based economy.

The mechanism of regional self-organisation involves the ability to adapt constantly regional institutions to changes in the competitive environment and, on the other hand, to generate changes within the region that anticipate innovations in its environment. Regional self-organisation pertains to the political sphere and to the management of institutions, as well as to the entire region. The political sphere includes the aspect of developing various old and new forms of local democracy and civil participation. It is related to the intellectual and moral level of the political elites and to the public activity of citizens. The management sphere considered from the point of view of the mechanism of regional self-organisation focuses on the issues of adapting new methods and co-management tools to the needs of public management and to create various, efficacious forms of this management.

The mechanism of regional self-organisation points to a high flexibility of the region that is capable of creating its own knowledge and competences, as well as to generate constantly innovation. New knowledge and innovations lead inevitably to a strategic change as a constant and gradual phenomenon in the process of regional development. Regional self-organisation is the essence of the fourth level of a region's learning.

The self-organisation processes within the region take place at various levels, from part to advance. In the case of learning regulated by the self-organisation mechanism, the point is to achieve such a level of self-organisation that the region can be treated as a system that is capable of an evolutionary change of identity. The change of identity is related to the behaviour of various entities within the region and to its leadership, as well as to the passing from old to new regional specialities. A revolutionary, discontinuous change of identity may take place at each breakdown of development processes in a region. An evolutionary change of identity is a change that controlled, in a sense. It is only possible once a region has achieved a high level of self-organisation. The starting point is the region's quality as a subject and the mechanisms of local

democracy. The region's quality as a subject is the necessary condition for completing the processes of self-organisation in the area. Local democracy is not a necessary condition for the occurrence of the learning region phenomenon; it is however, an extremely useful tool for reinforcing advanced learning processes.

Regional self-organisation regulates learning processes in a region if:

- the mechanisms of local democracy make it possible to choose and verify leadership,
- the choice of leaders contributes to the establishing of entrepreneurial and managerial behaviours,
- the leadership strengthens the leaders of the change confronted with the outsiders.

Learning in the region takes place while sectors representing various stages of the life cycle function within its space, including mature and declining ones. Therefore, it takes place in conditions of co-existing processes of creation and elimination. The region's learning regulated by self-organisation processes means, on the one hand, that the region can handle problems created by mature sectors on its own (losing declining sectors) and, on the other hand, that it can create new regional specialities. The fourth level can be defined as a regional system of sustained strategic change.

4.3 Building of a learning region as a challenge for the regional development policy

The modern shape of regional development policy is determined, among others, by the concept of the learning region. Each region faces the challenge of having to organise and direct learning processes. The extent and the way in which the regional development policy will make use of the learning region concept leads to the acquisition of the characteristics of an intelligent region (to various extents in various regions). An intelligent region is an area, which fits in well with technological development processes, with the new economy based on networks, clusters, information, and knowledge in a globalised market context, sectors, and regions.

Learning regions can create themselves. It is however important to formulate and apply, alongside this cultural, and spontaneous process, a "tough" policy of building a learning region, or a "soft" policy of supporting learning processes within the region. One can indicate the essential parts of the learning region's policy, such as the principles and targets of the policy, the strategic directions of investment, and the theme priorities.

Table 4.2 10 rules of a policy for building a learning region

-
1. The rule of developing effective, individual learning during the whole life (continuing education) based on providing high quality educational services in the region.
 2. The rule of making full use of individual learning by skilfully co-ordinating supply and demand with respect to highly competent human capital.
 3. The rule of using interactive co-operation networks between companies and inside companies for the organisational process of learning in the region.
 4. The rule of creating favourable conditions for organisational learning for all the companies that have the potential to develop a high level of innovation.
 5. The rule of systematic recognition and the evaluation of region's resources, which are an obstacle to its economic development, or that, could prove useful for developing innovative strategies.
 6. The rule of positive reaction to new economic and social conditions and of making actors on the regional scene abandons their routine behaviour.
 7. The rule of co-ordinating sectarian policies in the region and of using effective procedures of co-ordinating decisions and actions of the authorities at many levels.
 8. The rule of strategic reinforcement of various forms of social capital in the region as a basis for organisational learning and innovation.
 9. The rule of constant evaluation of the interdependencies between the region's inhabitants participating in individual learning, innovation processes in companies and changes that take place on the regional labour market.
 10. Rule of social legitimacy for the strategy of learning and innovation in the region undergoing economic transformation.
-

Source: Own work based on Cities and Regions in the New Learning Economy (2001). OECD, Paris. p. 120.

High quality workplaces should be regarded as the general purpose of the learning region's policy. The high quality of workplaces in various businesses and sectors is achieved in regions where capitals (economic, human, organisational, social, and cultural) are convertible. High quality workplaces are the source of a high degree of employability and productivity that lead to the creation of new values, raising benefit and the quality of life. The essence of a learning region's development is the transformation of its capitals in a kind of business capital belonging to the regional community and to the regional, knowledge-based economy, ultimately leading to the increase of the region's competitiveness.

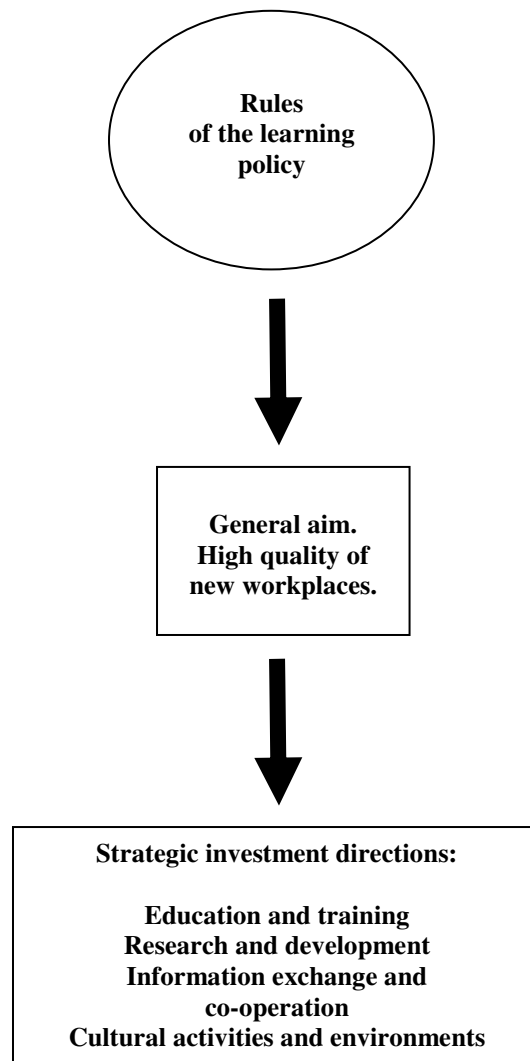
The specific aims of the learning region's policy may differ depending on the level of learning and on the circumstances that characterise the region. The specific aims that are possible to achieve in a learning region at one of the four

levels of learning described above should take into account the type of learning mechanism, from the internal integration mechanism to the regional self-organisation one. For instance, in a situation where the internal integration mechanism dominates, the specific targets may relate to the modernisation and extension of the educational system in the region, focusing on the quality of education in the secondary education sector, as well as on building a civil society in a region that is open towards the world.

The specific aims of a learning region in a situation where the self-organisation mechanism dominates, i.e. in the case of culturally and civilised advances for regions whose reference to global trends is the highest, will mostly relate to new competences, new business and social activities and new forms of leadership created by means of alliances, networks and clusters.

Accomplishing the regional aims and specific policies of the learning region requires setting strategic directions for investments. These investments contribute to the determination and enrichment of the regional capitals described before, i.e. the human, organisational, social and cultural capital (figure 4.2).

Figure 4.2 The region's learning policy. (Block diagram)



Source: Own work

Note: specific policy aims disorganise the general aim and the theme priorities within the strategic directions of investment are specific and depend on the region.

Strategic investment directions require to be converted to the list of theme priorities depending on the specific conditions that prevail in each region. Giving shape to the theme priorities of the regional learning policy in regions at various stages of the learning process will depend on the types of projects and activities undertaken.

4.4 Case study: regional innovation system of the Śląskie Voivodeship¹⁷

Building a coherent regional innovation system is an attempt to face the challenge of making the Śląskie Voivodeship a learning region. The Voivodeship is one of the leading areas in Poland in terms of social and economic potential. A characteristic feature of the region is its large population (4.8 million people), inhabiting a relatively small area of the country (3.9%). As a result, population density in the region is 3.2 times that of the Polish average. In 2000, when preparations began related to working on a regional innovation system, the economic potential of the Śląskie Voivodeship measured by GDP value gave it the second place in Poland after the Mazowieckie Voivodeship with the country's capital, Warsaw. The most important issue then, from the point of view of the region's sustained development, seemed to be the quick restructuring of its economic tissue, i.e. of the traditional sectors of the economy, as well as improving the potential for development of sectors that had shown growth and had perspectives for future growth. Adopting the formal criterion of the time of duration of projects strictly related to the process of building a regional innovation system, one can assume that the process began in 2001. It can now be divided in the following stages: creation of a Regional Innovation Strategy, creation of an executive programme for the Regional Innovation Strategy and implementation of the Regional Innovation Strategy.

The Regional Innovation Strategy for the Śląskie Voivodeship for the years 2003-2013 was created in relation to the *RIS-Silesia* project. It was carried out with the financial support of the Fifth EU Framework Programme and the *Regional Innovation Actions* competition launched in 2000. As a result, the Śląskie Voivodeship became one of the 16 regions from countries that used to be EU candidates at the time for which a Regional Innovation Strategy was created that complied with the methodology promoted by the European Commission and which had the latter's support. Working on the creation of the strategy involved the following basic parts:

¹⁷ By mgr M. Baron [M.A.].

- analysis of the innovation potential of R&D units and business support institutions, as well as integrated economic analysis of the structure of the Śląskie Voivodeship,
- meetings and individual interviews, workshops and expert groups,
- meetings of the Regional Innovation Forum – platforms for making contacts and meeting people involved in pro-innovation actions in the region, representatives of business and related circles, scientific institutions and local authorities.

About 600 representatives of companies and institutions worked on the Regional Innovation Strategy from 2001-2004.

The strategy document contains a division into strategic areas, strategic aims, and specific (operational) aims. The three strategic areas can be described using the keywords: companies' innovativeness – R&D potential – trust.

Strategic area 1. Increasing the participation of highly innovative companies in the total number of small and medium enterprises has the following strategic aims:

- 1.1. Increasing trust on the part of companies by improving the business atmosphere.
- 1.2. Supporting excellence in SMEs.

Strategic area 2. Increased use of the research and development potential has the following strategic aims:

- 2.1. Strengthening excellence in the R&D sector.
- 2.2. Introducing technologies that are essential for the development of the region's economy to the R&D sector.

Strategic area 3. Ensuring an efficient Regional Innovation System based on mutual trust, creativity and perfection has the following strategic aims:

- 3.1. Developing co-operation between partners to provide innovation.
- 3.2. Supporting the creation of new, innovative products and companies.

Specific (operational) aims are shown in the table 4.3.

Table 4.3 Building of the Regional Innovation System in the Śląskie Voivodeship and the strategic capabilities of learning regions

	<i>Capability of</i>			
	<i>keeping and strengthening coherence¹⁸ of the region</i>	<i>creating and developing capitals</i>	<i>proactive adaptation</i>	<i>evolutionary change of identity of the region</i>
Operational aims of the Regional Innovation Strategy:				
1.1.1. Increasing the access of SME's to useful information.	+	+	+	
1.1.2. Organising the system of financing innovative activities of SME's.	+		+	
1.1.3. Adapting the training and counselling offer related to innovation to the needs of SME's.	+	+	+	
1.1.4. Increasing the influence on the administrative, legal and economic environment.	+		+	+
1.1.5. Applying best practices as an inspiration for SME's to undertake innovative action.	+	+	+	+
1.2.1. Strengthening strategic approach in SMEs			+	+
1.2.2. Promoting innovation culture in SME's.		+	+	+
1.2.3. Supporting the effective use of the market potential in the unified European market by SME's.			+	+
1.2.4. Supporting the use of ICT technologies in SME's.	+	+	+	+
2.1.1. Supporting innovation culture in the R&D sector.		+	+	+
2.1.2. Supporting market reorientation			+	+

¹⁸ The economic, social and spatial coherence.

Table 4.3 (cont'd)

	<i>Capability of</i>			
	<i>keeping and strengthening coherence¹⁹ of the region</i>	<i>creating and developing capitals</i>	<i>proactive adaptation</i>	<i>evolutionary change of identity of the region</i>
2.1.3. Increasing participation in international collaborative networks.		+	+	
2.2.1. Supporting the specialisation of the R&D sector operating in traditional sectors.		+	+	
2.2.2. Supporting the creation of new specialisations in the R&D sector.		+	+	+
2.2.3. Promoting best practices to advertise the region.		+	+	+
3.1.1. Developing sectorian collaboration with the participation of SME's.	+	+	+	+
3.1.2. Creating a flexible network structure for innovation.	+	+	+	+
3.1.3. Supporting the process of predicting market trends.			+	+
3.2.1. Promoting industrial design.			+	
3.2.2. Increasing the use of the industrial property right.		+		
3.2.3. Supporting innovation culture in the educational system.	+	+	+	+
3.2.4. Supporting the creation of innovative companies.	+	+		+
3.2.5. Facilitating technology transfer.		+	+	

Note: "+" indicates a strong connection.

Source: Own work.

¹⁹ The economic, social and spatial coherence.

The basic aims to be accomplished within the framework of the Regional Innovation Strategy:

- 1 A Regional Innovation System based on collaborative networks between business support organisations, the R&D sector, local authorities and companies, operating since 2005,
- 10% increase in the number of new patents registered annually, since 2008,
- 100 new innovative companies created until 2008 thanks to technologies developed at R&D centres and higher education institutions,
- 1,000 small and medium enterprises operating in 15 local and regional clusters until 2008,
- 10.000 students annually involved in activities related to innovation and entrepreneurship since 2005.

These plans have been reflected in the provisions of the first of the two executive programmes included in the Regional Innovation Strategy.

In 2005, the Voivodeship Board presented the Executive Programme 2005-2008 for the Śląskie Voivodeship Regional Innovation Strategy for the years 2003-2013. The document contained nine priorities to be achieved in the period 2005-2008:

1. Development of a Regional Innovation System
2. Creation of a Regional Information System for SMEs
3. Creation of a Regional System for financing the development of SMEs with regard to innovation
4. Supporting the effective use of market possibilities by SMEs in the unified European market
5. Change of the image of the Śląskie Voivodeship
6. Innovation culture in the region
7. Regional economy supported by strong technological clusters
8. Development of an innovative economy based on co-operative networks
9. Supporting the creation of innovative companies

Moreover, the executive programme was supplemented by a list of pilot projects proposed by economic and scientific circles, as well as by local authorities, recommended by the Controlling Committee of the Regional Innovation Strategy for the Śląskie Voivodeship in June 2004. Potential sources of funding were also indicated in relation to the achievement of the priorities included in the executive programme.

Implementation of the Regional Innovation Strategy for the Śląskie Voivodeship was based on three functions: co-ordinating, managing and monitoring. The co-ordinating function is carried out by a Co-ordinating Unit created at the Department of Strategy and Spatial Planning of the Office of the Marshal of the Śląskie Voivodeship. This unit is currently carrying out a three-year (2005-2007) project related to the *Establishment of regional innovation monitoring in the Śląskie Voivodeship, Innobservator Silesia I*, financed by the European Social Fund and by the state budget. The partners of the region's authorities for the project are the Silesian University of Technology and the Statistical Office in Katowice. Polish and foreign experts are also participating.

The managing function is performed by a consortium carrying out a three-year (2005-2007) project *Managing Unit for the Regional Innovation System in the Śląskie Voivodeship*. This project, which is also financed by the European Social Fund and the state budget, is a direct continuation of another project, *RIS-Silesia*. The Managing Unit carries out the following principal tasks:

- building and development of the Regional Innovation System using the Regional Innovation Forum created within the framework of *RIS-Silesia*,
- initiating new methodologies of supporting innovation at all stages,
- stimulating the work of expert groups in nine theme areas according to the priorities of the executive programme,
- stimulating initiatives to raise the level of innovation culture in the region,
- supporting the creation of networks and clusters to make better use of the market potential.

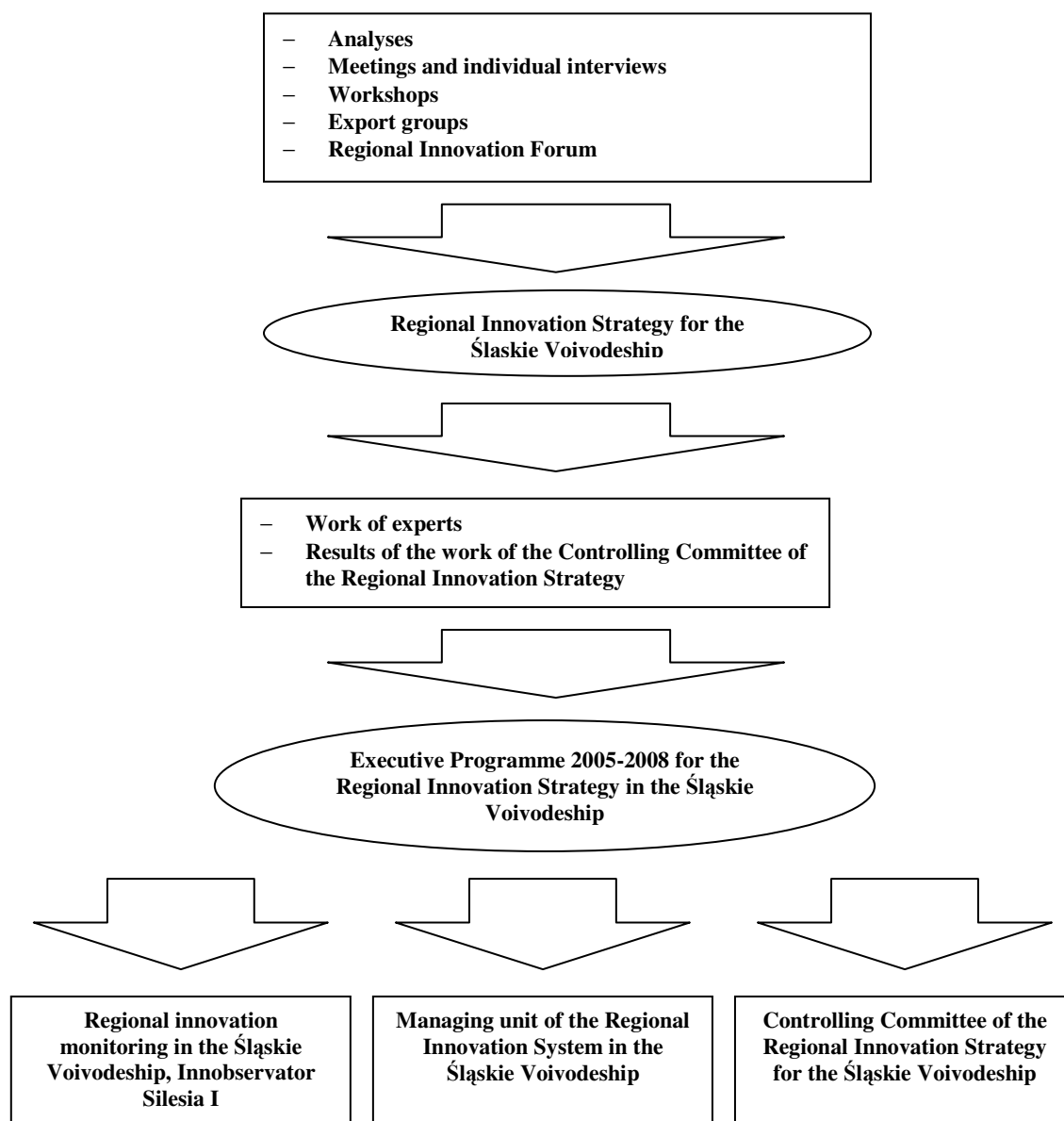
The project consortium includes institutions involved in innovative activities, selected by the following: the Regional Conference of Rectors of Academic Schools (the University of Economics in Katowice and the Silesian University of Technology), the Silesian Council of Research and Development Units (Institute for the Chemical Processing of Coal), Silesian Consortium of Institutions Supporting Enterprise Development (Upper Silesian Agency for Enterprise Restructuring), Self-Governing Economic Body (Regional Chamber of Commerce) and the Silesian Gmina and Powiat Association (the City of Gliwice).

The monitoring function was given to a Controlling Committee, which provides counsel to the region's authorities with regard to adapting the strategy to the changing economic situation. The Committee members are selected from the members of the Regional Innovation Forum. The term of office of the Committee members is three years.

Figure 4.3 illustrated the use that has been made of the process of building the Regional Innovation System in the Śląskie Voivodeship as a

method to improve the region's ability to learn and to become a learning region. The figure confronts the strategic premises for the development of the Regional Innovation System with the four strategic capabilities of learning regions described above.

Figure 4.3 Process of building the Regional Innovation System in the Śląskie Voivodeship



Source: Own work.

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5

Innovation, Proximity and Learning. A Case Study of Patterns of Learning²⁰

Leon A.G. Oerlemans, Tilburg University

Marius T.H. Meeus, University of Utrecht

Frans W.M. Boekema, Tilburg University

5.1 Introduction

A growing body of theoretical research is addressing the importance of learning in the organisational and technological renewal of firms, and therefore in their efforts to improve competitiveness (Daft & Huber, 1987; Levitt & March, 1988; Huber, 1991; Dodgson, 1993; Blackler, 1995; Dodgson, 1996). In these discussions, regions are thought to have important features for facilitating innovation too (Florida, 1995; Cooke, Gomez Uranga, Etxebarria, 1997; Morgan, 1997). This paper reviews literature on organisational learning and networks, learning regions as systems of innovation, and the role of proximity in the transfer of information and knowledge.

Literature on organisational learning and regional systems of innovation takes the embeddedness or relational perspective on innovation as a point of departure. Moreover, in studies on proximity the existence of embeddedness is often taken for granted. But, is embeddedness always as important for innovation as assumed? And is proximity really of importance in systems of innovations? In this paper, these questions are explored empirically. After a brief discussion of theoretical literature on organisational learning, economic networks, and spatial proximity, the paper focuses on the empirical exploration of patterns of learning in a specific Dutch region. Learning organisations are depicted as problem-solving actors. In coping with innovation problems, actors participate in different kinds of networks. Finally, the spatial dimension of these networks is investigated.

5.2 Organisational Learning and Economic Networks

Conceptions of organisational learning are omnipresent. Not only organisational theory has addressed the issue, but a range of other academic disciplines (e.g. industrial economics, strategic management, and psychology) have also studied it. A number of reasons can be suggested why the study of

²⁰ This is a slightly adapted version of a chapter in a publication of 2000 by the same authors.

organisational learning is so fashionable at present (Dodgson, 1993). First, learning is seen as a key to competitiveness. Learning enables organisations to develop structures and systems that are more adaptable and responsive to change. Second, and partly related, is the deep influence that rapid technological change has on organisations. There is an increasing need for firms to learn to do things in a new, and often drastically different, way. Third, the concept of learning has a broad analytical value.

Both within and between disciplines there is rarely any agreement as to what learning is, and how it occurs. Various fields of literature tend to examine the outcomes of learning, rather than inquire as to what learning actually is and how these outcomes are achieved. Learning, in the sense it is used here, relates to firms, and comprises both processes and outcomes. In general terms (Huber 1991), someone/something learns if the range of its potential behaviours is changed through the processing of information. More specifically for organisations, it can be described (Dodgson, 1996) as the ways firms build, supplement, and organise knowledge and routines around their competences and within their cultures, and adapt and develop organisational efficiency by improving the use of these competences. Competences are the focussed combination of resources within a firm, which define its business activities and comparative advantage. This definition of organisational learning contains a number of important assumptions (Dodgson, 1993):

- Learning has positive consequences even though the outcomes of learning may be negative. Here, it is important to note that firms learn by making mistakes and solving problems. Morgan (1997) also stresses the problem-solving capacity of learning organisations.
- Although learning is based on individuals in the workforce of the firm, it is assumed that firms can learn.
- Learning occurs throughout all the activities of the firm. It occurs at different speeds and levels. Encouraging and co-ordinating the variety of interactions in learning is a key organisational task.

How do firms learn? A major mechanism by which firms learn about technology is through their internal R&D efforts. They also learn, of course, from a wide range of other internal functions, particularly from marketing and manufacturing and from the interactive interactions between these functions. Furthermore, learning has both an 'internal' and 'external' component. External links, with customers, suppliers, and other sources of information and knowledge, are critical in assisting a firm's learning processes.

The argument that external links are important for firms as proposed by literature on organisational learning, can also be found in literature on economic

networks. The main difference between these two bodies of literature is that in the former the accent is on the importance of these links for the *learning processes* of firms, whereas in the latter the emphasis is on the formation of network structures and their *impact on the innovation process*. The network structures enable innovating firms to perform in a more efficient way.

The economics network approach, especially as developed by Håkansson (1987, 1989, 1992, and 1993) and Håkansson & Snehota (1995), provides us with a framework to analyse the relation between learning, innovation and networks. Håkansson's economic network model contains three main elements: actors, activities, and resources. *Actors* perform activities and possess or control resources. They have a certain, but limited, knowledge of the resources they use and the activities they perform. Their main goal is to increase their control of the network. Actors in networks can be studied at different levels, from individuals to groups of firms. Two main types of *activities* are distinguished in the network model: transformation and transaction activities. Both are related to resources because they change (transform) or exchange (transact) resources through the use of other resources. Transformation activities are performed by one actor and are characterised by the fact that a resource is improved by combining it with other resources. Transaction activities link the transformation activities of the different actors. These exchanges result in the development of economic (network) relations between actors. There are several types of *resources*: physical (machines, raw materials, and components), financial and human (labour, knowledge, and relations). Furthermore, resources can be classified according to the degree of organisational control. In the case of internal resources the firm has hierarchical control. External resource providers control external resources. As a consequence, resources are heterogeneous, i.e. their (economic) value depends on the other resources with which they are combined.

Despite Håkansson's claim that resources or knowledge bases are heterogeneous, and internal and external, he does not specify which bases he is referring to. If we assume that innovation is a knowledge-intensive process, we must determine which 'knowledge bases' (Dosi, 1988: 126) innovators can use. Smith (1995: 78-81) systematises the attributes of, what he calls, a 'modern view' on technological knowledge. One of these attributes is that technological knowledge is differentiated and multi-layered. At least three different knowledge bases can be discerned. First, there is the general (scientific) knowledge base. This base is highly differentiated internally and of varying relevance for industrial production and innovation. Secondly, knowledge bases exist at the level of the industry or product field and entail shared understandings of technical functions, performance characteristics, use of materials, etc., for products and processes. This knowledge and these practices shape the performance of firms in an industry. Thirdly, the knowledge bases of firms are highly localised and specific. They tend to comprise one or a more technologies and practices that they understand well and form the basis of their competitive position. This firm-specific knowledge base is not only technical, but

also concerns the way in which technical processes are interwoven with other firm activities. These include identifying market opportunities, financing, purchasing, and marketing new products and processes.

The fact that knowledge bases of (industrial) firms are multi-layered has two important consequences for the use of Håkansson's economic network model. Firstly, it means that although individual innovating firms are competent in specific areas, their competence is nonetheless limited. In other words, innovating firms use their specific knowledge bases to innovate but they can easily run into problems. The solution of these problems may lie outside their area of expertise. Therefore, they must be able to access and use new internally and/or externally generated knowledge (learning) to solve these problems. Secondly, the multi-layered and heterogeneous nature of knowledge bases makes it necessary to distinguish several actors and institutions inside and outside the firm in which knowledge is embodied. Internal resources are embodied in the transformation (R&D, production) and transaction (purchase, marketing/sales) functions of the firm. Outside the firm, at least three groups of actors can be distinguished: the public and private knowledge infrastructure, and the production chain. The public knowledge infrastructure consists of organisations such as universities and colleges for professional and vocational training. These knowledge bases are mainly of a general (scientific) kind. Trade organisations, consultants, and intermediaries such as Chambers of Commerce and regional Innovation Centres populate the private knowledge infrastructure. The first two have technological knowledge mainly related to the industry or product field. The last two can be seen as information brokers. They are able to give general and specific information on innovation and business related issues, but they are also able to bring parties into contact with each other. The third and last group is called the production chain. Suppliers, buyers, and other firms such as competitors are part of this group. The technological knowledge embodied in these actors is also mainly related to the industry and product field.

The linking of learning, innovation, and networks hinges on the heterogeneity of resources and resource mobilisation. According to Håkansson (1993), the effects of heterogeneity are that knowledge and learning become important. How should the firm handle these heterogeneous resources? In answer to this question, Håkansson cites Alchian & Demsetz (1972: 793) who state that 'efficient production using heterogeneous resources is not a result of having better resources, but knowing more accurately the relative performance of the resources'. In other words, it is not only necessary to have resources, but also to know how to use them.

This knowledge can be acquired in two ways: internally and/or externally. Learning to use internal resources can be accomplished in several different ways, for example through R&D activities or learning by using or doing. The external mobilisation of resources can be labelled 'learning by interacting' (Lundvall, 1988: 362), i.e., firms can use the knowledge and experience of other economic actors.

To make use of external resources, firms need to exist within structures that make these learning processes possible and efficient. According to Håkansson, economic network relations produce structures characterised by stability and variety. First, scarce external resources are more easily mobilised through stable relations with other economic actors. Second, stable relations in networks enable innovating firms to gather knowledge and to learn how to use heterogeneous resources innovatively and efficiently from other actors. Third, the stability of economic network structures provides a basis for variety. This variety offers new opportunities for innovation.²¹

The economic network approach makes it clear that firms can supplement their innovation process by using external resources. They can acquire knowledge supporting their innovation processes, through the use of their economic network relations.

Although the relational view on learning and innovation processes is important in the organisational learning literature and in the economic network approach, the spatial dimension is often left implicit. So, in order to focus on the link between learning, innovation, and proximity, these literatures have to be connected. This link can be found in the work of Lundvall on systems of innovation and in the work of Maillat on 'milieux innovateurs'.

5.3 Systems of Innovation, 'Milieux Innovateurs' and Proximity

To make this link clear, one must go into the concept of RIS. A RIS can be divided into three parts that make up the term: Regional, Innovation and System. Before discussing the regional or spatial dimension, we shall first explore the concept of the innovation system.

Innovation can be defined as the process by which firms master and put into practice product designs and manufacturing processes that are new to them (Nelson & Rosenberg, 1993). Defined in this way, it is clear that innovation is a process. In this process new knowledge or new combinations of old knowledge are embodied in products and production processes and possibly introduced into the economy. Put in a simple way, *innovation is the result of learning processes*. Learning leads to new knowledge and firms use this knowledge in an attempt to improve products and production processes. As Lundvall (1992) stated, there now is growing support for the view that innovation is an interactive or a relational process: between firms and the knowledge infrastructure, between the different functions within the firm, or between users and producers. The interactive characteristics of the innovation process are the link with organisational learning.

²¹ The variety argument of Håkansson is a variation on Granovetter's idea of weak ties. In his famous article 'The Strength of Weak Ties' (1973), Granovetter argues that actors receive most new (innovative) information through their weak ties with other networks.

In system theory, a system consists of a number of discrete elements and the relationships between them. A system of innovation therefore comprises elements of importance to innovation and the relationships amongst them. Florida (1995) describes the basic elements of a system of innovation: (1) a manufacturing infrastructure, (2) a human infrastructure, (3) a physical and communications infrastructure, (4) a capital allocation system and financial market. These infrastructures can facilitate the innovation processes of firms.

The relationships between the elements in a system of innovation are the linkages that can be specified in terms of flows of knowledge and information, flows of investment funding, flows of authority and other arrangements such as networks, clubs, and partnerships. As Cooke, Uranga & Etxebarria (1997) state, these linkages or interactions are clearly a social process in which institutions are of importance. Consequently, innovation is shaped by a variety of institutional routines and social conventions (Morgan, 1997).

What is the regional or spatial dimension of these systems of innovation? In theoretical literatures several answers to this question are proposed. One of these answers refers to the relation between proximity and the type of knowledge exchanged (Storper & Harrison, 1992; Cooke et al., 1997). Knowledge is thought to be partly codified and primarily tacit. The argument is that tacit knowledge is highly personal and specific, hence it is not easily codified and communicated. Learning organisations interact with their environment. This has become essential as more and more firms externalise business functions. Where externalisation involves interactions at great distances, codified knowledge can be exchanged reasonably satisfactorily. But innovation is intimately bound up with tacit knowledge exchange. This is difficult to achieve at a distance. It is of importance to understand why regional systems of innovation are a valuable feature of innovation-based competitive advantage.

A similar line of thought is developed by Lundvall (1992), who studies the relationship between the character of technological change and the spatial interactions. Three types of technological change are discerned, namely stationary technology, incremental innovation, and radical innovation that are each associated with specific patterns of spatial interaction between users and producers.

In the case of stationary technology, the technical opportunities as well as the needs of users are fairly constant. There are available norms, standards, and terminologies available giving a near complete description of the technology involved. In other words, knowledge is highly codified. Such a high degree of codification means that communication between users and producers can be performed over long distances. If this is the case, industries virtually become footloose.

For incremental innovation, codes and channels of communication must be flexible in order to include technological opportunities and changing user needs. Recurrent changes in product specifications, functions, and qualities of artefacts constrain standardisation. Consequently, codification of knowledge is more

difficult. This means that messages are relatively complex and information cannot easily be translated. In this case space will play a role. The proximity of advanced users plays an important role in the adaptation process of an artefact to local conditions. Such industries, often a part of national industrial complexes, or clusters, are not footloose. Comparative advantages are often based on spatial proximity.

In the case of radical innovation, codes developed to communicate a constant, or a gradually changing, technology become inadequate. Producers who follow a given technological trajectory will have difficulties in evaluating the potentials of the new paradigm. Users will have difficulties in decoding the communications coming from producers, developing new products built according to the new paradigm. The lack of standard criteria for sorting out what is the best paradigm implies that 'subjective' elements in the user-producer relationships – like mutual trust and even personal friendship – will become important. These subjective elements are not easily shared across regional borders. So, here spatial proximity is extremely important for user-producer interaction.

In sum, the more radical the process of technological innovation, the less codified knowledge is. The more tacit the knowledge communicated the more important spatial proximity between user and producer is. So, there is a positive relationship between the level of tacitness of knowledge and the importance of spatial proximity.

A comparable line of thought on the relationship between innovation and proximity is developed in the 'milieux innovateurs' approach. The work of Maillat (1991) is of particular interest. Maillat argues that there are links between some features of the innovation process and the local environment. The importance of the local environment for the innovation process depends on the type of innovation involved. In addition, the innovation strategies applied by firms influence the character of the relation with the environment.

Regarding the type of innovation, the local environment is of little importance for firms developing incremental innovations. The resources needed for this kind of innovation is easily found within the firm. Firms with radical innovations develop more relations with the local environment. Mostly, the external resources are also needed to realise this type of innovation.

Maillat also postulates relations between the type of innovation strategy and the local environment. He distinguishes two kind of strategies: the exploitation of an already existing technological trajectory and 'technology creation'. In the first case, innovation is a process in which an already existing technology is used. For firms using this innovation strategy, the local environment is 'an external datum whence the firm derived its inputs' (Maillat, 1991: 111). In the second case, the local environment is an essential part of the innovation process of the firm. Because the outcomes of this kind of innovations are uncertain or even unknown, Maillat argues (1991, 111): 'indeed, the creation of technologies presupposes that the environment becomes an essential component of

innovation, that these various resources be used and combined to generate a new form of localised production organisation. The enterprise is then no longer isolated in a territory which represents to it only an external component, it helps to create its environment by setting up a network of partnership-style relations, both with other firms and with public and private training and research centres, technology transfer centres and local authorities'.

If we compare the lines of reasoning of Lundvall and Maillat some differences and similarities come to the fore. The main difference between Lundvall and Maillat concerns the assumed links between the characteristics of the innovation process and proximity. Lundvall stresses the interaction component in the system of innovation, i.e., the relation between the nature of the knowledge exchanged and proximity. Moreover, Lundvall focuses on a specific kind of relation, namely between users and producers. Maillat, on the other hand, takes a more resource-based view on the relation between innovation and space. Depending on the type of innovation or strategy involved, other or more (external) resources are needed. The local environment is mainly viewed as a resource base, but relations can develop between a wide variety of (local) actors. Both assume a similar relation between innovation and proximity. In short, they assume that the more radical innovations are, the more important proximity is. Although Lundvall and Maillat differ in their opinion about the relation between incremental innovation and space, they agree on the relation between radical innovation and proximity. In our empirical section about the relation between innovation and proximity, we return to these issues.

5.4 Research questions

The main aim of this paper is an empirical exploration of patterns of learning in a specific Dutch region. Answers are sought for the research questions mentioned below:

1. If learning organisations are depicted as problem-solving actors, it obvious to assume a relation between the number of innovation problems and the results of innovations. So, to what extent do innovation problems influence innovation results?
2. Learning has both an internal and external component. To what extent do internal and external knowledge bases as elements of the system of innovation contribute to the results of innovations?
3. Organisations learn by coping with (innovation) problems. We assume that different problem levels of the innovation process are associated with different patterns of learning. This raises the following question: To what

extent are the relations between internal and external contributions on the one hand, and the results of innovation on the other, influenced by different levels of innovation problems?

4. Innovating organisations learn through their external relations. Proximity is thought to be of importance in these learning processes. Is proximity indeed of importance in these innovative relations?

5.5 Method

Our study used a mailed questionnaire to obtain information on innovation processes from manufacturing and industrial firms with five or more employees in the region of North Brabant (a province in the southern part of the Netherlands). The data gathering took place between December 1992 and January 1993.

The data was collected in one of the most industrialised regions in the Netherlands. In 1992, the total number of jobs in manufacturing was roughly 210,000, i.e., the manufacturing sector share of employment was 28.8% (19.5% for the Netherlands).

The population of firms in the region consists of a mix of small, medium, and large enterprises. Furthermore, the manufacturing sector has a relatively high R&D and export performance (Meeus & Oerlemans, 1995). Because technological activity is an important issue in this paper, industrial firms were grouped according to Pavitt's taxonomy (1984). Oerlemans (1996) applied his criteria to the responding firms.²²

²² The taxonomy consists of four sectors

Pavitt sector	Typical industries
Supplier Dominated	Textiles; Leather goods and footwear; Furniture; Paper and board; Printing
Scale Intensive	Food; Metal products; Glass; Cement; Transport vehicles
Specialised Suppliers	Machinery; Instruments; Opticals
Science Based	Chemicals; Plastics; Electronics

Table 5.1 Population and sample divided into Pavitt sectors

<i>Pavitt sector</i>	<i>Population</i>	<i>% population</i>	<i>% sample</i>
Supplier Dominated	1,028	33.5%	25.7%
Scale Intensive	1,261	41.1%	36.1%
Specialised Suppliers	417	13.6%	21.4%
Science Based	363	11.8%	16.8%
Total	3,069	100%	100%

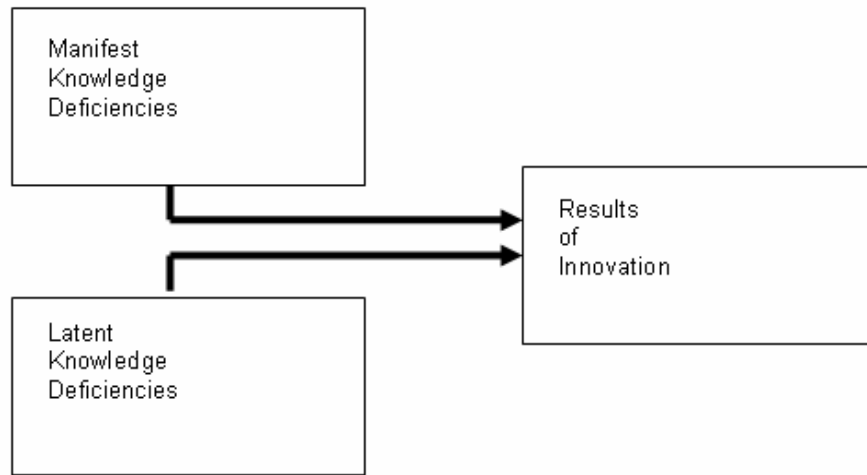
Source: authors

Table 5.1 shows that the sample is a fairly reliable representation of the population of industrial firms in the region of North Brabant. The maximum deviation between the proportions in the population and in the usable response is within 8 percentage points. The mean deviation between the percentages in the sample and in the response is 6.4 percentage points.

5.6 Innovation Problems and Innovation Results

For our first research question the model depicted in figure 5.1 is used as our model of analysis. As was stated before, we expect that more innovation problems are associated with poorer results of innovation.

Figure 5.1 Knowledge deficiencies and results of innovation



Source: authors

The dependent variable in this model is 'results of innovation'. It contains a count of the number of performance improvements due to product and process innovations (see table 5.2) achieved by a firm during the period 1987-1992.²³ This variable is calculated as the sum of the scores of the items divided by 8. A higher score indicates better innovative performance.

²³ Firms were asked to judge these performance improvements on a Likert scale with values ranging from (1) 'very little' to (5) 'very much'. The highest possible score of this compounded variable was 8, the lowest 0.

Table 5.2 Measurements of the variables used for research question 1

<i>Variable</i>	<i>Descriptions</i>	<i>Indicator</i>
<i>Dependent variable</i>		
IR	Innovation results	<i>Product and/or process innovations resulted in:</i> – cost price reduction – quality improvement of products or processes – increased production capacity – delivery time improvement – sales increase – profit increase
<i>Independent variables</i>		
LKD1	Number of innovation problems by nature (latent knowledge deficiency)	– exceeding time planning – product deficiencies – technical production deficiencies – exceeding budgets – bad timing – wrong partners – reaction of competitors – insufficient market introduction efforts
LKD2	Number of innovation problems by stage (latent knowledge deficiency)	– idea formation – economic feasibility – technical feasibility – technical realisation – implementation – introduction and production
MKD	Manifest knowledge deficiencies	1. Shortage of skilled workers (dummy). 2. Lack of technical knowledge (dummy).

Source: authors

Four independent variables were used. Two of them indicate latent knowledge deficiencies: LKD1 and LKD2. LKD1 measures the number of innovation problems distinguished by their causes (e.g. exceeding time schedules, bad timing, or insufficient marketing efforts). The variable LKD2 indicates the number of stages in the innovation process that were problematic (e.g. economic or technical feasibility). Higher values of these variables signify

more innovation problems or more problematic stages in the innovation process, respectively. These variables are labelled *latent* knowledge deficiencies because we assume that real or manifest knowledge deficiencies are hidden behind the innovation problems mentioned by firms. After all, problems would not occur if the knowledge bases of the firms were sufficient in quantitative and qualitative terms.

The two other independent variables are labelled manifest knowledge deficiencies. On the one hand it concerns shortages of skilled workers, and the lack of technical knowledge on the other. Both variables are coded as dummies. The value 1 is assigned if these knowledge deficiencies constrain innovative activity. If this is not the case, the value of the variables is 0.

Using multiple regression analysis, the relationship between the dependent and the independent variables is investigated. The result of this analysis is presented in table 5.3.

Table 5.3 OLS estimates with innovation results as the dependent variable and latent and manifest knowledge deficiencies as independent variables

<i>Independent variables</i>	<i>Beta</i>
<i>Latent knowledge deficiencies:</i>	
LKD1	0.04
LKD2	0.06
<i>Manifest knowledge deficiencies:</i>	
Shortage of skilled workers	-0.10*
Lack of technical knowledge	-0.11*
R ²	0.03
Adj. R ²	0.02
F value	2.21
Sign. F	0.068

Note: * p < 0.10, ** p < 0.05, *** p < 0.01, **** p < 0.001.

Source: authors

The results of the estimation only signify a partial confirmation of our expectations. Only the variables 'shortages of skilled workers' and 'lack of technical knowledge' show the expected negative relationship with innovation results. In other words, only variables indicating manifest knowledge deficiencies have an impact on innovative performance.

The percentage of variance explained of the estimation is extremely low (3%). Moreover, the magnitude of the beta coefficients is small and their statistical significance is poor. So, it can be concluded that the obvious

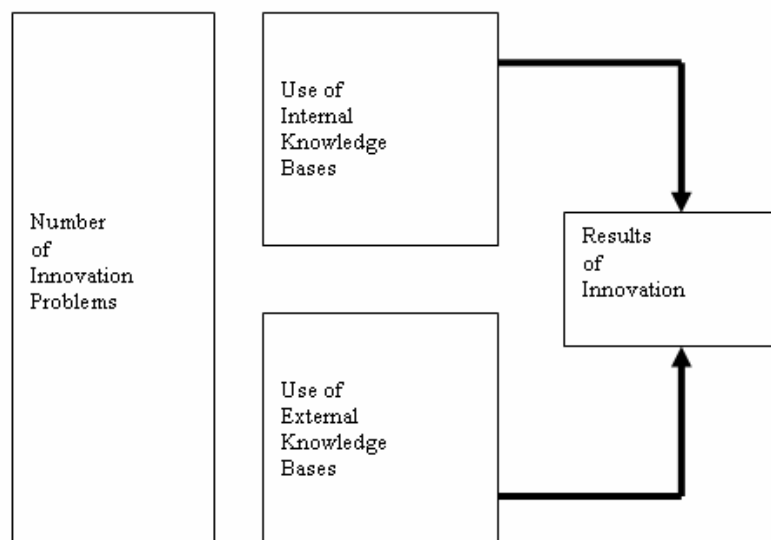
assumption regarding the negative relationship between innovation problems and innovative performance is not empirically obvious at all.

Our analysis shows that latent knowledge deficiencies – the problems innovating firms encountered in the period 1987-1992 – did not constrain their innovation results. Our interpretation of these results is that innovating firms, however difficult it may be, are able to produce positive innovation outcomes. As learning organisations, they are capable of solving their problems. In the light of this interpretation the question emerges how these firms solve their problems and where they obtain the necessary resources.

5.7 Coping with Knowledge Deficiencies: The Use of Internal and External Knowledge Bases

Our second and third research question concern the relationships between the use of internal and external knowledge bases as elements of the system of innovation, and their impact on the innovative performance of firms. The conceptual model in figure 5.2 is used to answer these questions. The model can be considered an empirical application of Håkansson's economic network model.

Figure 5.2 The use of internal and external knowledge bases and results of innovation



Source: authors

Again the variable 'innovation results' is used as the dependent variable. Furthermore, six independent variables are included in our analyses (see Table 5.4). Two of them describe the use of internal knowledge bases (transformation (TF) and transaction (TA) function of the firm). Three external knowledge bases are discerned: public (EC1), private (EC2), and business (EC3) knowledge bases. These five variables are measured in the same way. Firms were asked how often in the past 5 years external organisations thought up ideas for, or made an important contribution to the realisation of innovations.⁵ Higher values of these variables indicate a more intensive use of the knowledge base involved. The sixth independent variable is 'technology policy'. It describes the total number of technology policy instruments used by a firm and can be interpreted as an external financial resource stimulating innovation provided by a government, and being part of the national system of innovation. The higher the score on this variable, the more technology policy instruments are used.

Table 5.4 Measurement of variables used for research questions 2 and 3

<i>Variable</i>	<i>Descriptions</i>	<i>Indicators</i>
<i>Moderating variable</i>		
LKD1	Number of innovation problems	see Table 5.2.
<i>Dependent variable</i>		
IR	Innovation results	see Table 5.2.
<i>Independent variables</i>		
– former work		
TF	Use of knowledge base of the transformation function	– R&D function. – Production function.
TA	Use of the knowledge base of the transaction function	– Marketing/sales function. – Purchase function.
EC1	Use of public knowledge bases	Contributions to the innovation process by (technical) universities and colleges for professional and vocational education.
EC2	Use of private knowledge bases	Contributions to the innovation process by intermediaries (Innovation Centres and Chambers of Commerce) and the private knowledge infrastructure (trade organisations, National Centre of Applied Research (TNO), private consultants).
EC3	Use of business knowledge bases	Contributions to the innovation process by important buyers, suppliers, and competitors.
TP	Technology policy	Number of technology policy instruments used by a firm.

Source: authors

The number of innovation problems (LKD1) is used as a moderating variable.²⁴ With a rank procedure, innovating firms are divided into three subgroups: firms with low, medium, and high levels of innovation problems. In this way, it is possible to make separate estimations for subgroups.

Table 5.5 Results of factor analysis on the use of external knowledge bases

<i>Factors and items</i>	<i>Factor Coefficients</i>	<i>Labels of knowledge bases</i>
<i>Factor 1 (EC1):</i>		
Technical universities	0.78	– Contributions of the public knowledge infrastructure.
Other universities	0.74	
Colleges	0.74	
MBO	0.58	
<i>Factor 2 (EC2):</i>		
Trade organisations	0.70	– Contributions of private knowledge infrastructure.
Regional Innovation Centres	0.66	
Chambers of Commerce	0.66	
National Centre of Applied Research (TNO)	0.59	
Consultants	0.49	
<i>Factor 3 (EC3):</i>		
Important buyers	0.73	– Contributions of the Production chain.
Important suppliers	0.72	
Competitors	0.66	

Source: authors

In table 5.5, different groups of actors who influence the innovation process were distinguished on theoretical grounds. Subsequently, the question was addressed whether these theoretical dimensions also exist empirically. In order to

²⁴ In this analysis one of the two variables describing latent knowledge deficiencies is used as a moderating variable. The main reason for this is that the variable LKD1 gives us the best indication of the difficulties during the innovation process. In our view, the variation in problems is a better indicator for this level of difficulty than the stages of the innovation process in which they occur.

²⁶ The three factors were found using a varimax rotated principal components analysis. The KMO measure of sampling adequacy was 0.767. Bartlett's Test of Sphericity was 1008.38 (sign. 0.0000). The cumulative percentage of variance explained was 51.5%.

answer this question, factor analysis was applied which resulted in the three factors presented in table 5.5.²⁶

Factors EC1-EC3 represent contributions to the innovation process by the public and private knowledge infrastructure, and the production chain. In short, we can conclude that the results of this factor analysis empirically confirm the initial categorisation. Factors EC1-EC3 were used as independent variables in further regression analyses.

To investigate research question 2 and 3, four OLS models were estimated, one for the total response and three for the different levels of innovation problems. Once more, estimations are produced using multivariate regression analysis with the model in figure 5.2 as the point of departure. As can be seen in Table 5.6, all models are significant as indicated by the F-values and their levels of significance. The percentages of variance explained varies between 11% for the model with firms having medium problem levels in their innovation process, and 27% for the model with firms having a highly problematic innovation process.

Table 5.6: OLS estimates with innovation results as the dependent variable and the use of internal and external knowledge bases for the innovation process as independent variables: a comparison between different levels of innovation problems

<i>Independent</i>	<i>Problem levels in innovation process</i>			<i>TP</i>
<i>Variables</i>	<i>Low (n=54)</i>	<i>Medium (n = 60)</i>	<i>High (n = 145)</i>	<i>(n = 216)</i>
<i>Internal knowledge bases:</i>				
Transformation (TF)	0.46***	-0.05	0.03	0.26****
Transaction (TA)	0.11	0.32**	0.21***	0.07
<i>External knowledge bases:</i>				
EC1	-0.12	-0.17	0.01	-0.02
EC2	0.16	0.18	0.22***	0.18****
EC3	0.21	0.02	0.37*****	0.24*****
TP	-0.05	-0.08	0.18**	0.10
R ²	0.22	0.11	0.27	0.19
Adj. R ²	0.20	0.08	0.25	0.17
F value	13.19	5.56	12.84	16.017
Sign. F	0.001	0.022	0.000	0.000

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, **** $p < 0.001$.

Source: authors

The model that includes all responding firms shows that both the use of internal and external knowledge bases are positively related to results of innovation. The higher the contributions of the transformation function (internal knowledge base), the contributions of the private knowledge infrastructure and the production chain (external knowledge bases), the more positive the results of innovation. Therefore, the analysis shows that an additive combination of the use of internal and external knowledge bases results in a better innovative performance, stressing the importance of including network variables in the analysis of innovation.

Furthermore, it becomes clear that the estimations made for subgroups of firms distinguished by the number of innovation problems encountered differ strongly regarding the use of internal and external knowledge bases. Firms with a few innovation problems only use their internal transformation function to achieve better results. The second group, firms with medium problem levels, utilises the knowledge bases embodied in the transaction function to obtain a better innovative performance. The same is true for firms with high problem levels, the third group distinguished, though in this group the contributions of the private knowledge infrastructure, the production chain and the use of technology policy instruments are also positively related to innovative performance.

An interesting pattern emerges from these analyses. The more problems firms encounter in their innovation processes, the more these innovation firms take an external orientation. In other words, the system of innovation is especially of interest for firms with highly problematic innovation processes.

Next, it is interesting to examine which specific internal and external knowledge bases are positively related to the results of innovation. In order to perform this analysis, we used the individual items of the statistically significant independent variables and correlated them with results of innovation. As a measure of association we used the Spearman rank correlation. The coefficients and their significance are presented in table 5.7.

For innovating firms with a low level of innovation problems, we see that especially the contributions of the production function are positively correlated with the results of innovation. The R&D function is also of importance, but to a much lesser extent. The transaction function made positive contributions to the results of innovation for firms with medium problem levels. Within this function, the contributions of the purchasing function to the innovation process proved to be positively related with results of innovation. The marketing function also has a positive tendency, but is not significant statistically. For firms with highly problematic innovation processes, the utilisation of internal knowledge bases is not enough to solve their problems. They have to obtain external resources too. Consultants, buyers, other firms, but especially suppliers become involved in the innovation process of these firms.

Our empirical findings enable us to formulate two conclusions. First, our analyses make clear that the number of problems that firms encounter in their innovation process is a factor of importance. The patterns of relations and

learning in the system of innovation are strongly influenced by the different problem levels. Second, Von Hippel's claim about the importance of buyers, the so-called lead-users, for the innovation process is differentiated. Important buyers are indeed making positive contributions, but it turns out that suppliers are even more influential.

Table 5.7 Spearman rank correlations between the results of innovation and the use of specific internal and external knowledge bases

<i>Level of problems innovation projects</i>		
<i>Low</i>	<i>Medium</i>	<i>High</i>
Items Transformation:	Items Transaction:	Items Transaction:
R&D (0.25*)	Purchase (0.38**)	Purchase (0.11)
Production (0.49***)	Marketing (0.17)	Marketing (0.13*)
		<i>Items EC2:</i>
		Trade organisation (0.13)
		Innovation Centres (0.16*)
		Chamber of Commerce (0.01)
		TNO (0.15*)
		Consultants (0.22***)
		<i>Items EC3:</i>
		Important buyers (0.20**)
		Important suppliers (0.31***)
		Other firms (0.21**)

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Authors

Until now we have focussed on patterns of relations and learning without paying attention to the spatial dimension of the system of innovation. In the next section, this issue is dealt with.

5.8 Spatial Proximity in The System of Innovation

As was stated in the previous section, innovating firms learn through their external relations. Spatial proximity is thought to be of importance in these learning processes. Is proximity indeed of importance in these relations? To answer this fourth research question, three approaches are used. First, we investigate the spatial distribution of buyers and suppliers who influence the

innovation process. In this way, we have an indication of the importance of localised ties within the (regional) system of innovation. Second, we look at a specific characteristic of these relations: the transfer of knowledge. As was argued by Lundvall, precisely this feature of interaction between actors in the system of innovation is thought to have an important effect on the spatial distribution of innovative relations. Third, we investigate the relation between radicalness of innovations and spatial proximity. This analysis is based on the arguments of Lundvall and Maillat regarding the relation between the type of innovation and proximity.

The variables used to answer research question 4 ²⁷ are presented in table 5.8. First, an important remark has to be made. In this section, the analysis is focussed on a specific group of relations of innovating firms. This pertains to the relations with other economic actors that are, in the view of the innovating firm, most important to the innovation process. Six variables are used in the analysis.

²⁷ Firms were asked to judge the impact of these knowledge bases on the innovation process on a Likert scale with values ranging from (1) 'never' to (5) 'always'. Regarding the internal knowledge bases, we distinguished functions instead of departments because a large part of our population of firms consisted of SMEs.

Table 5.8 Measurement of variables used for research question 4

<i>Variable</i>	<i>Descriptions</i>	<i>Indicators</i>
TS	Type of supplier most important for innovation	(1) raw materials (2) components (3) machines & tools (4) consultants
TB	Type of buyer most important for innovation	(1) consumer (2) retail/wholesale (3) industrial user
LS	Location Supplier	(1) Southern part of the Netherlands.
LB	Location Buyer	(2) Elsewhere in the Netherlands. (3) Abroad.
KT	Knowledge Transfer	(1) never (2) sometimes (3) regularly (4) often (5) always
TI	Type of innovation	(1) no innovations (2) process innovation (3) product innovation
LI	Level of innovation	(1) incremental (2) radical

Source: authors

In the previous section, it was shown that especially suppliers and buyers are important external knowledge bases for innovating firms. To study the role of these economic partners more in depth, we asked the innovating firm several questions regarding the specific type of actors involved and various features of their network relations. First, we asked what kind of supplier (TS) or buyer (TB) was most important for the innovation process. Four types of suppliers (TS) were distinguished: suppliers of raw materials, product parts and components, machines and tools, and consultants. As regards the most essential buyers for the innovation process, three types were discerned: consumers, retail/wholesale, and industrial users. Second, we asked the innovating firm to indicate the spatial location of the buyer or supplier involved. Three possibilities

to answer were provided: the southern part of the Netherlands, elsewhere in the Netherlands, and outside the Netherlands.²⁸ Third, the transfer of knowledge between the innovator and economic actors in the system of innovation is believed to have an important influence on the spatial embeddedness of relations in the system of innovation. Therefore, we asked the innovation firm to what extent knowledge transfers occurred between supplier and buyer on the one hand, and the innovating firm on the other. Fourth, the spatial distribution of buyers and suppliers is supposed to be influenced by the type and level of innovation produced by the innovating firm. Therefore, we asked questions about the type of innovations (product or process innovations) and the level of the innovations (incremental or radical) produced by the firms.

Let us first look at the spatial distribution of suppliers and buyers essential to the innovation process (table 5.9).

Table 5.9 Spatial distribution of suppliers and buyers most important for the innovation process

	<i>SN</i>	<i>EN</i>	<i>AB</i>
<i>Type supplier</i>	<i>Location supplier</i>		
Raw materials (n = 54)	29.6%	35.2%	35.2%
Components (n = 79)	43.0%	22.8%	34.2%
Machines (n = 125)	27.2%	36.0%	36.8%
Consultants (n = 15)	53.3%	46.7%	0.0%
Total (n = 273)	33.7%	32.6%	33.7%
<i>Type buyer</i>	<i>Location buyer</i>		
Consumer (n = 13)	38.5%	61.5%	0.0%
Retail/wholesale (n = 104)	26.9%	53.8%	19.2%
Industrial user (n = 160)	48.8%	26.3%	25.0%
Total (n = 277)	40.1%	38.3%	21.7%

Note: SN= Southern part of the Netherlands; EN = Elsewhere Netherlands; AB = Abroad.

Source: authors

²⁸ The southern part of the Netherlands is a region containing three provinces all located in the south of the Netherlands: Noord Brabant, Zeeland, and Limburg.

It is clear that suppliers of machines and tools are mentioned most often as the most important supplier contributing to the innovation process. Approximately 46% (125/273) of the innovating firms named this type of supplier. Suppliers of product parts and components come second (about 29%). Industrial users dominate the group of buyers influencing the innovation process. About 58% of the innovating firms considers this type of buyer the most important for their innovation processes.

With regard to the spatial distribution of the suppliers, it appears that they are more or less equally distributed over the three geographical areas distinguished. This means that one out of three suppliers is located in the southern part of the Netherlands. The relations with suppliers of product parts and components and consultants in particular show signs of spatial concentration. About 53% of the consultants and 43% of the suppliers of components and parts are located in the southern part of the Netherlands. However, for the largest group of important suppliers (machines and tools) proximity seems to be less important.

As can be seen in the lower part of Table 5.8, buyers important for the innovation process are more spatially concentrated than suppliers are. Approximately 40% of these buyers are located in the proximity of the innovating firm. This percentage is even higher for industrial users. Nearly 50% of this type of buyers is located in the southern part of the country.

It can be concluded from this analysis that the spatial dimension of innovative relations is indeed of importance. A large part of the innovative relations with suppliers and buyers can be found in the proximity of the innovating firm. Our findings stress the importance of particular elements in the (regional) system of innovation for technologically active firms.

As was argued by Lundvall, the transfer of knowledge between actors in a system of innovation is supposed to be sensitive to geographical distance. Thus, the obvious choice is to investigate the relation between knowledge intensity of innovative relations on the one hand, and the spatial distribution of innovative relations on the other. The results of this analysis are presented in table 5.10.

Table 5.10 Spatial distribution of suppliers and buyers most important for the innovation process and the extent of knowledge transfer

	<i>SN</i>	<i>EN</i>	<i>AB</i>	<i>Total</i>
<i>Knowledge transfer</i>	<i>Location supplier</i>			
Sometimes	26.1%	25.3%	20.0%	23.8%
Regularly	29.3%	34.5%	38.9%	34.2%
Often	44.6%	40.2%	41.1%	42.0%
<i>Knowledge transfer</i>	<i>Location buyer</i>			
Sometimes	35.4%	49.5%	38.3%	41.4%
Regularly	37.2%	29.5%	31.7%	33.1%
Often	27.4%	21.0%	20.0%	25.5%

Note: SN= Southern part of the Netherlands; EN = Elsewhere Netherlands;
AB = Abroad.

Source: authors

First, a comparison between relations with buyers and relations with suppliers regarding the extent of knowledge transfer shows that relations with suppliers are more knowledge intensive. 42% of the firms that have innovative relations with suppliers state that deliveries of suppliers are 'often or always' associated with the transfer of knowledge. The percentage for the innovative relations with buyers is about 25%.

Second, innovative relations with buyers and suppliers located in the southern part of the Netherlands are neither more nor less knowledge intensive than the relations with buyers and suppliers located in the two other geographical areas distinguished in our analysis. So, there seems to be no relation between the extent of knowledge transfer and the proximity of buyers and suppliers important for innovation.

Perhaps, this result has to do with fact that we did not make a specification, as Lundvall and Maillat propose, of the character of the technological change involved. After all, a consequence of their line of reasoning is that the importance of proximity for innovation depends on the technological opportunities and the needs of users. Using Lundvall's ideas empirically, it is possible to formulate two expectations concerning the relation between the type and level of innovations and proximity:

1. In the case of firms with incremental process and product innovations, a large amount of the innovative relations with suppliers and buyers should be found in the southern part of the Netherlands. Because of restrictions in the standardisation process and the importance of tacit knowledge, proximity

plays an important role in the process of the adaptation to local conditions of a product or process. If we apply the arguments of Maillat, the opposite should be the case. Due to the fact the resource base of firms with incremental innovations is sufficient, the local environment is not important for these firms.

2. The role of proximity becomes even more important in the case of firms with radical product and process innovations. As a result of a lack of standard criteria for evaluating technological opportunities and user needs, so-called 'subjective' elements, like trust, become important. Subsequently, the majority of suppliers or buyers should be located in the proximity of the innovating firm.

The table 5.11 shows that there are no differences between firms with incremental and radical process innovations with regard to the spatial distribution of suppliers most important for their innovation process. The same is true for the relations of such firms with buyers. As regards firms with product innovations, some differences can be noted. Although the percentages of firms with relations with suppliers located in the southern part of the Netherlands are nearly equal, especially firms with radical product innovations have a high percentage of relations with suppliers outside the Netherlands. A comparison of firms with incremental or radical product innovations and their relations with buyers shows that a relatively high proportion of the buyers of firms with incremental product innovations are located in the proximity of the innovator.

In sum, there are some differences between incremental and radical process or product innovators regarding the spatial distributions of their buyers and suppliers important for innovation, but the overall picture does not lead to a confirmation of Lundvall's and Maillat's ideas about the relation between the character of technical change and the interactions in space. The expected importance of proximity for firms with radical innovations in particular is not found.

Table 5.11 Spatial distribution of suppliers and buyers most important to the innovation proces: a comparison between types and levels of innovation

		<i>Level of innovation</i>			
		<i>Process innovations</i>		<i>Product innovations</i>	
<i>Location of suppliers</i>					
		<i>(n = 230) ($IF^2 = 0.39$, sign. = 0.823)</i>		<i>(n = 214) ($IF^2 = 1.76$, sign = 0.416)</i>	
		<i>Incr. (n = 187)</i>	<i>Rad. (n = 43)</i>	<i>Incr. (n = 164)</i>	<i>Rad. (n = 50)</i>
<i>SN</i>	33.2%		32.6%	35.4%	34.0%
<i>EN</i>	34.2%		30.2%	29.9%	22.0%
<i>AB</i>	32.6%		37.2%	34.8%	44.0%
<i>Location of buyers</i>					
		<i>(n = 226) ($IF^2 = 0.13$, sign. = 0.939)</i>		<i>(n = 226) ($IF^2 = 2.18$, sign. = 0.336)</i>	
		<i>Incr. (n = 178)</i>	<i>Rad. (n = 48)</i>	<i>Incr. (n = 164)</i>	<i>Rad. (n = 62)</i>
<i>SN</i>	38.2%		35.4%	36.0%	25.8%
<i>EN</i>	37.6%		39.6%	40.2%	48.4%
<i>AB</i>	24.2%		25.0%	23.8%	25.8%

Note: SN = Southern part of the Netherlands; EN = Elsewhere in the Netherlands, AB = Abroad. Incr. = incremental innovations; Rad. = Radical innovations.

Source: authors

5.9 Conclusions and Discussion

In this paper, learning organisations were depicted as problem-solving agents. The obvious negative relation between the number of innovation problems and results of innovation (question 1) was not confirmed. Our interpretation of this result was that learning organisations were able to cope with these problems in such a way that their innovation outcomes were not hampered.

Next, the ways in which firms coped with these innovation problems was investigated (question 2 and 3). Using an empirical application of Håkansson's economic network model, evidence was found that a combination of the use of internal and external knowledge bases improved innovation results. So, the importance of the relational perspective on innovation processes was confirmed empirically. But, the estimations proved to be sensitive to the amount of innovation problems encountered by firms. Higher levels of innovation problems were associated with the utilisation of more, and a more diverse set of, external knowledge bases contributing to the innovation process. These findings stress the fact that the embeddedness or the relational perspective on innovation should not always be taken for granted. The strong emphasis in present day

literature on the importance of interorganisational relations for the economic performance is mitigated by our empirical findings. The innovative performance of firms is not always influenced by the extent to which firms are embedded. More particularly, firms with low levels of innovation problems proved to be utilising internal knowledge bases only.

Our findings concerning the importance of proximity in systems of innovations were somewhat puzzling. On the one hand, a large number of the innovative relations with buyers and suppliers most important for the innovation process were found in the proximity of the innovating actor. As a consequence of this result, one can conclude that proximity is indeed of importance. On the other hand, it turned out that the assumptions of Lundvall and Maillat were not confirmed. First, innovative relations with buyers and suppliers located in the southern part of the Netherland were just as knowledge intensive as relations with buyers and suppliers located in other areas. Second, the expected importance of proximity especially for firms with radical product and process innovations was not found.

From these findings one can conclude that proximity is indeed of importance for the innovating firms in our research, but other variables than the one proposed by Lundvall and Maillat influence the spatial distribution of innovative relations in the system of innovation. Research by Oerlemans, Meeus and Boekema (1998: 36-43) has shown that firm characteristics, such as firm size, were better predictors of the spatial distribution of innovative relations, than the extent of knowledge transfer. Smaller firms were more spatially embedded than large firms. Such results indicate that the development stage that a firm is in has greater influence on its composition of spatial relations than the features of its innovation process. Therefore, future research should have a greater focus on the life cycle of the firm and its relation with spatial embeddedness.

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6

Learning Region Approach as the Explanation for Origins of IT Clusters' Development in Malopolska and Upper Silesia

**Grzegorz Micek, Institute of Geography and Spatial
Management, Jagiellonian University of Cracow**

6.1 Introduction

In contemporary world more emphasis is placed on skills, know-how, qualifications than on natural resources. In the case of resources knowledge is not learnt once and for all, the various actors (firms, organisations, regions) must attend to keep them up to date, to reproduce and to process them. European Union reports suggest that even the most specialized forms of knowledge are becoming a short-term resource, due to the accelerating pace of changes in the global economy (Wolfe, 2002). This is why the learning processes become so important, since it is thanks to them that new knowledge emerges and is being transmitted.

There are three important and interrelated phenomena which characterise the contemporary economy. The first relates to the development of knowledge-based economy and consequently to growth of information and communication technologies (ICT). The second process is the movement towards flexible specialisation. The third phenomenon corresponds to changes in the process of innovation which require more and more interactions between the actors (Lundvall and Johnson, 1994; Gregersen and Johnson, 1997). The necessity to develop a knowledge-based economy and information society has encouraged geographers, sociologists, planners and other scientists to deal with the learning region concept.

One of two objectives of the chapter is to analyse different approaches to a paradigm of a learning region and assess which approach best corresponds to learning in IT sector. The learning region may be considered from four different perspectives

- individual employee,
- individual company,
- the group (network) of companies,

- the public institutions.

The crucial issue corresponds with the question how region may learn? The general overview is given in the table 6.1. In fact this table may be simplified, as companies and public institutions learn with by their employees.

Table 6.1 Mechanisms of learning

<i>Perspective</i>	<i>How learning evolves?</i>
Individual employee	- direct learning (e.g. trainings) within the company - indirect learning (e.g. co-working with other employees, contacts with classmates and colleagues who work in the sector)
Individual company	- learning of individual people (e.g. movement of key professionals between companies and consequent flows of knowledge)
The group of companies	- formal contacts between companies (trade relations) - informal contacts between companies (meetings of managers who were classmates)
Public institutions	- contacts with enterprises (experience-sharing) - contacts with foreign public institutions (experience-sharing)

Source: author's elaboration.

Firms clustered in the same region often share a common regional culture which can act to facilitate the process of social learning. Research indicates that such firms build up a common language or code of communication through repeated interaction over time. Because much of the most important knowledge transmitted between parties in the innovation process is tacit rather than codified, this characteristic confers a crucial advantage on firms which participate in such networks of exchange (Patel and Pavitt, 1994). Finally, this interaction-facilitating common language or code of communication is further supported by the creation of regional institutions which helps to produce and reinforce a set of rules and conventions governing local firms' behaviour and inter-firm interaction.

6.2 Learning Region and its Theoretical Framework

Lundvall and Johnson (1994) introduce new perspective to the learning economy and claim that knowledge is the most fundamental resource and learning the most important process. This concept addresses 4 specific issues. Theses four concerns are: that the sustainable advantage of the learning region

is tacit and explicit knowledge creation; that innovation is created and reproduced through firms, networks and suppliers' system; that the human infrastructure requires a learning region which is educated and highly specialised and that the communication networks and organizations must be globally oriented and operate through electronic data exchange (Doloreux 2002).

Not many clear definitions of this type of region exist. One may refer to Walther (1998) who, writing about Germany, states they are debating how the partners in training and qualifications in local communication areas and in the regions (the *Länder*) can best form cooperating networks to deal with the complexity and rapidity of industrial change. The idea of a learning region is not the one of getting together all the high-level expertise in a given place. The concern is to build the maximum number of links between those who are active on the local training market, whoever they are and whatever their status. The focus is on the employment and innovation potential of small firms; and their effect is to establish partnership between small firms, training providers, social partners, and public authorities. The goal is to establish at one and at the same time an approach to improving skill and qualifications, and an effort to identify new jobs. In fact, the concept of learning region finally make sense in the desire of companies themselves to develop a capacity for training and the means to deliver it. Thus, they become true learning enterprises (Walther, 1998).

In European research into the learning region the central focus is shifted towards contributions that social capital and trust make to supporting dense networks of inter-firm relationships and the process of interactive learning. The role of knowledge spill-overs is also stressed (Wolfe, 2002). B. Asheim (2001) in his definition of learning region puts emphasis on the role of cooperation and resulting collective learning. There are three different perspectives of learning region concept (Hassink, 1999): structural, which considers the learning region as a spatial outcome of grand societal changes; actor-related, focusing on entrepreneurial learning for innovation; action-related, which sees the learning region as a new regional development paradigm, the principal aim of which is to achieve or support collective learning processes. The critical elements describing the learning region concept are knowledge customers and suppliers, inter-firm relations and networks and a high degree of rivalry between actors (Doloreux 2002). In such perspective the learning region may be treated as the cluster where knowledge flows serve to increase the competitiveness of the region.

In American approach developed by Florida (2000b) learning region is a region that emerges through continuous innovation and the adaptation ability to changing market conditions. The Florida's approach uses 'collectors and repositories of knowledge that facilitate flows of knowledge, information and ideas.' In his recent research R. Florida (2000a, 2002) focuses on talents as the critical factor of production in the emerging new economy. He argues that regional growth depends on the ability of locales to generate, attract and retain

the highly skilled workers that are essential for establishing and growing technology-based companies. Their ability to do so, depends, in turn, on the presence of a high degree of tolerance and a wide variety of social and environmental amenities attractive to high technology workers (Florida, 2000a).

Wolfe (2002) suggests that learning depends on the presence of two crucial factors: a certain degree of business intelligence that serves as the demand trigger for new knowledge and the access to, or availability of that knowledge. He points out that the 'intelligent cell' that trigger the learning process is fundamental for success of learning. The common view of most European regions focuses on the regional government and its development-related agencies playing a key role in animating the regional innovation system to stimulate the learning process. Wolfe (2002, p. 9) claims that 'for this to succeed, however, regional governance structures must undergo a cultural and organizational shift away from traditional bureaucratic structures towards more flexible and less rigid institutional forms that can develop effective partnerships with private sectors organizations and associations'. This requires a willingness to move from procedure-centred approach to build more consensus and inclusiveness of companies in the policy process. However, does such a significant involvement of enterprises in developing RIS take place in CEE countries? What are the obstacles that lead to minor involvement of companies in creating regional innovation systems? This questions will be addressed in next paragraphs.

The constellation of institutions at the regional level that contribute to the innovation process is labelled the regional innovation system (Braczyk et al., 1998). This set of institutions, both public and private, produces pervasive and systemic effects which encourage firms within the region to adopt common norms, expectations, values, attitudes and practices — in short, a common culture of innovation that is reinforced by the process of social learning. Definitions of a regional innovation system vary, but for present purposes, it is defined as 'the set of economic, political and institutional relationships occurring in a given geographical area which generates a collective learning process leading to the rapid diffusion of knowledge and best practice' (Nauwelaers and Reid, 1995). Lundvall (1992) has identified the core elements that comprise innovation systems, which are: internal organization of firms, the inter-firm relations, the role of public sector, the institutional set-up of the financial sector, R&D intensity and R&D organizations.

6.3 *The Learning Regions from the Perspective of Knowledge Dissemination*

The crucial aim of the paper is related to identification of forms of knowledge dissemination within IT sector. The knowledge dissemination process describes flows of knowledge as potential means of learning. It may be assumed that the knowledge dissemination is locally embedded. In IT sector (Crone, 2002) region

may learn directly from two different points of view: from human or institutional perspective. From the first perspective knowledge is transferred by flows of professionals and migration of top-managers and industry leaders. Informal networking (informal venues like meetings with friends in social settings) may be also in favour of knowledge flows. Spin-offs of new companies from existing businesses seem to present the scale of knowledge dissemination. From institutional perspective knowledge is transferred via activities of key actors, e.g. formal contacts on scientific conferences.

The concept of clusters has been used in the research. The cluster approach was developed in order to describe the competitiveness of industries and companies in a specific local, regional or national environment. Porter (1990) suggests that success of firms in a particular region and industry is influenced by four elements: local production factors, conditions of demand, state of supporting industries, strategy and rivalry of enterprises.

Broad definition of IT sector is applied in the paper. IT sector consists of computer services (NACE 72) and hardware manufacturing (NACE 3001). Location quotients and Van den Linde's (2003) research framework have been applied in order to identify possible clusters of IT industries in Poland (Micek, 2006b). Based on location quotients twenty five potential local clusters were identified – three of them were larger agglomerations that cross counties' boundaries. In terms of regional clusters the most remarkable agglomerations are identified in Mazowieckie, Upper and Lower Silesia and Malopolska regions. In fact the strength of clusters is directly influenced by regional centres (Warsaw, Katowice conurbation, Wroclaw, Cracow) and the growth apart from Upper Silesia and Malopolska the growth of IT companies is not reported in other smaller centres. To sum up, Malopolska and Upper Silesia have been identified as potential clusters in the initial phase (Micek 2006a).

In order to catch factors behind agglomeration processes and to identify the scale and scope of learning over 100 interviews were conducted in some Polish regions. In-depth interviews concerning origins of companies and the role of different types contacts in the learning process were conducted in Katowice conurbation – center of Upper Silesia (13 core cities – almost 2 million inhabitants), cities of: Cracow (capitol of Malopolska region – 750 thousand inhabitants), Bielsko-Biala (almost 180 thousand inhabitants, located in Silesian region). Information about career paths was derived from Who is who (2005) in Polish ICT sector. 131 career paths of Polish managers and owners of ICT companies were collected in order to identify the character of flows of professionals.

6.4 *Learning Region Theory in Regional Programming*

The development of knowledge is the key to regional development. If this is true the approach contributes nothing new to the simple idea that training and education policy is the key to success. The concept of the learning region is

misleading as it leads us to believe that the region learns (Maillat and Kebir, 2001). Of course it is the actors who learn (as vehicles for the transmission of knowledge and decision-takers). Moreover, the learning region cannot be discussed in isolation from clusters. Indeed, it is the nature of the latter which defines the nature of the relations which the actors have spun and maintain. Thus, it is essential that the actors are sufficiently autonomous or become sufficiently so for the interactions to become evident. In these terms the learning region is a region in which the actors make use of the necessary learning which makes it possible to constitute an innovative cluster and to keep it dynamic.

The role of politicians is to guide the learning processes with a view to bringing about interactions, to territorialising firms, to developing new knowledge or even to modifying institutions. The interviewed managers often claim that involvement of enterprises in regional programming does not have any positive influence of the functioning of the company. It does not give them measurable effects. Among rare applications of learning region concept into regional programming there are programmes of long-life learning in Malopolska and networking projects in Upper Silesia. The Council on Information Society in Malopolska tries to establish directions and initiate necessary actions in order to improve telecommunication infrastructure and support learning schemes at the universities.

The learning region concept is present in the regional development documents (e.g. by ideas of: knowledge network, long-life learning, e-learning, e-trainings). However, according to over 2/3 of interviewed managers the learning region emerges by itself, not by the activities of regional bodies. Some entrepreneurs even claim that the local and regional government spoils the learning process by many unnecessary actions (e.g. high-budget programmes) that are not tailor-made and do not correspond to needs of companies.

6.5 Knowledge flows in IT sector in Malopolska and Upper Silesia

Is it possible to put theoretical 'learning regions' paradigm into practice? There are three different approaches to operationalisation of learning region approach. First comes the qualitative approach. There is claimed in the paper that knowledge flows may only be assessed and can not be precisely measured. Secondly, the learning region emerges in regional programmes, but in Poland the concept it is not comprehensively taken into account in planning documents. The third method of operationalisation corresponds to identification and assessment of the scale of learning mechanisms. The scale and scope of them can be assessed in in-depth interviews that have been used in the chapter. Therefore, forms of knowledge dissemination have been chosen to be identified in the regions.

6.5.1 Flows of IT Professionals and 'Embodied Expertise' through the Local Labour Market

In order to assess the character of mobility of professionals the analysis of career paths was conducted. The average period of working in current workplace equals 8 years. The mobility of Polish managerial class is largely limited. There are only few jumpers, largely on top-managerial positions. Only 1/4 of managers changed the city of workplace. Over 2/3 of such changes were reported as movements to Warsaw (mainly from Cracow and Wroclaw). According to interviews, the estimated number of yearly movements from Cracow to Warsaw in IT sector doesn't exceed 50 professionals. Interviews depict that the scale of work experience gained abroad is relatively low. However, contacts established there had a crucial significance in setting up few companies in Poland. Analysis of career paths also show that the experience of work or studying abroad is shared by 20% of managers (8% of managers demonstrate experience from USA). Aforementioned numbers are surprisingly low and point to the conclusion about the major role of locally embedded abilities and skills. The unwillingness to potential migrations and the high level of commitment to current workplace lead to a limited scale of flows of professionals. Such immobility enhances several university cities to be a centres of IT entrepreneurship.

6.5.2 Informal and Formal Networking

The short analysis of places where IT professionals meet after work sheds a new light on the scale of the informal contacts. Many companies have their preferred restaurants and pubs, usually nearby the workplace. Employees meet their with customers, they also go there after work. One of catering places in a office park is very important in terms of pulling down new employees from companies. As it is said by interviewees the scale of informal meetings between employees of IT companies is limited by the lack of time and large amount of time committed to work.

In the beginning of 1990s the scale of informal events was larger than today. The popular meeting place was carnival balls organised by Cracow's companies and the biggest world companies (Sun, IBM). The artistic programme of those events was perfect and the number of tickets hadn't allowed all interested to come in. The reductions in amount of money spent by foreign companies on informal events led to the cease of the ball.

Members of scientific organisations and managers point out that there is a significant scarcity of technological conferences in Cracow and Upper Silesia. It does not enhance the knowledge dissemination process that usually takes place on such conferences, seminars or fairs. Currently Warsaw is predominantly a center of both scientific and business events.

Incubators of entrepreneurship that facilitate spin-offs may be called 'rara avis' of IT business in Poland. However, the trend towards thinking about establishing profiled incubators is remarkable. In Cracow the second IT incubator will be set up in next 2 years.

It has been already mentioned that firms clustered in the same region often share a common regional culture which can act to facilitate the process of social learning. This is the case of Upper Silesia where historical factors have led to distinct regional dialect and culture of hard work. It results in better understanding of mutual needs and higher degree of trust (if we can call it trust, see next paragraphs). The research indicates that such firms build up a common language or code of communication through repeated interaction over time.

Among investigated cities Cracow is definitely the place where scientific and business-scientific events take place more often. Organised from 2001 Cracow Grid Workshop has been gathering scientists and managers from all over the world. The newest trends in computer science have been discussed at the Academy of Economics. There are also Polish Group of LabView Users, Cracow's Group of Linux Users and Cracow's Group of NET Developers. Particular attention should be paid to the group of students who established the association IT in Cracow under the umbrella of Gridwise Tech company. The objective of its activity is to present information about interesting events and job vacancies in Cracow's IT sector. The non-profit project has not been supported by any regional bodies and it is largely recognised by Cracow's IT companies. The association has recently started joint project with Marshall's Office concerning labour market in IT industry in Cracow. In the near future this association may emerge as a regional informal body that may reinforce contacts between companies, employees, graduates and students and enhance inter-firm interaction. There is no such regional informal entity in Upper Silesia, but the communication language and mutual understanding is better here.

The project entitled eCluster (Malopolski Klaster Informatyczny) is financed from the European Social Fund distributed by regional activities and it unconsciously supports learning region. The project is the initiative of the local entrepreneur who functions in IT business for a few years and previously has been working in a public sector.

Main objective of eCluster are as follows:

- building a network of linkages between IT companies and universities in order to train future employees,
- promotion of cooperation between companies, universities and governmental bodies in order to acquire in the future an advantage in the form of increased region's competitiveness,

- development of the initiatives that will positively influence development of IT industry in Malopolska (especially small and medium enterprises),
- promotion of Malopolska as a competitive European region (*eKlaster*, 2006).

The project directly supports learning through internships. The indirect, but expressed aim is to create local industry leaders.

Aforementioned examples show that regional government should support programmes from the beginning. Nevertheless they must be conducted very carefully and actions should be orientated towards continuous, tailor-made learning (e.g. in a form of internships).

Despite relatively strong social capital, two networking initiatives experienced a cold welcome among Upper Silesian entrepreneurs. Clusters of innovativeness that was planned to be developed failed due to the lack of mutual trust. The Prelude initiative of the Silesian Marshall's Office financed under 5th EU Framework Programme was not successful in establishing links between companies and its members.

Overwhelming lack of mutual trust has two explanations. Under the socialism there was a tendency not to trust too much. Older managers still present such attitude to other companies that are ready to cooperate. The more common explanation is the high level of competition, especially among small companies, that don't want to reveal secret data, so they cooperate only with a limited number of friends. Polish medium-sized companies is the only type that have seen the opportunity to cooperate with other enterprises. Some owners claim that coopetition takes place – companies compete in one field (sales of particular type of software) and cooperate in the other (network solutions for logistics and transport sector). However, still overwhelming lack of 'milieu of trust' is a problem that hampers clusters' growth. It also leads to difficulties in finding a Western-origin theoretical concept that describes the growth of industries in post-communist economies.

Other initiatives of enhancing local clusters in high tech industries (e.g. PRELUDE Silesia) were not successful, because the projects were managed by the local authorities. Successful networking projects can be initiated only by the managers of high tech companies – see the case of Malopolski Klaster Informatyczny (Micek 2006a). According to author's research, the soft key factors of success are largely underestimated – the excellent catering is one of the crucial elements of improved networking (Micek 2006a).

Some managers claim that true objectives of the project remain unknown ('it was developed to serve one specific company'). Moreover, the coordination of the project was housed in Marshall's Office that according to entrepreneurs 'doesn't understand needs of companies' and 'initiatives dominated by public administration are from the very beginning destined to fail'.

The IT Highway (literally The Highway of New Technology Companies) is one of the most famous initiatives of transregional cooperation in southern Poland. It's the offensive strategy of regions' development based on intellectual resources and opportunities created by the use of IT technologies. The idea was developed by Jerzy Szymura – the former CEO of one of the leading IT companies in Upper Silesian region. The measure of real success of the project is the agreement between four voivodship marshals signed in 2002. Four regions (Malopolskie, Slaskie, Opolskie, Dolnoslaskie) have been included in the project. The project consists of: agreement of 4 Polish regions, IT Highway Association – A4 Club, The Technology Parks Agreement (planned), IT Highway Fund (planned), Agreement of BCC (planned), Access to funds, local and foreign, also from the EU. IT Highway Association (A4 Club) is planned to be active in order to make access to investment funds easier for companies, support initiatives related to regional development and promote and support enterprises that utilize the Internet as an information tool for the promotion of the EU (Szymura, 2002). The idea is perfect, but in fact cooperation between entrepreneurs is still very limited. There are some weaknesses of IT Highway idea. Companies are not interested in the project, because it is too broad and does not show specifically how involved enterprises can benefit (Bukowski and Micek, 2006). The fee is too high (1000 euro yearly). There is a lack of practical answer from regional authorities, eg. the repeated request from IT highway whether there is a possibility to use the office (one room) in regional institutions remained unanswered. Last but not least, the main coordinator of the project is perceived as unreliable (esp. in Upper Silesia), because his company went bankrupt in 2002. It is said it has led "some other suppliers out of business". The activity of IT Highway (not the idea) has been suspended by Szymura, but it is currently considered to be renewed due to the fact that Szymura has been elected to Polish Parliament. However, it is not obvious whether IT Highway will receive enough attention among entrepreneurs.

Knowledge sharing takes place in informal venues (e.g. anniversaries of birthdays, graduation, etc.) when study friends gather together. In the case of 15 interviewed managers such spontaneous meetings occur at least once a month. Not only family and life, but also technology and business issues are discussed there. The relations with colleagues have been stronger and more important than contacts with managers from other companies (table 6.2). Strong social capital of Upper Silesian society is supported by common contacts (by coffee drinking or pizza having) between friends. Informal venues are more common in Upper Silesia than in Cracow. There are social meetings among members of Upper Silesian branch of Polish Information Processing Society. Spontaneous meetings are organized by employees of the former company Pik-Net. They also chat via internet on the special mailing list.

Table 6.2 Role of personal contacts in conducting business

<i>Importance of the factor</i>	<i>Contacts with people from other companies in the region</i>	<i>Contacts with friends from previous workplaces or studies</i>
<i>In total</i>		
Very important or important	46%	54%
Unimportant or rather unimportant	49%	37%
<i>Cracow</i>		
Very important or important	53%	54%
Unimportant or rather unimportant	39%	35%
<i>Katowice conurbation</i>		
Very important or important	44%	58%
Unimportant or rather unimportant	56%	42%

Source: author's research.

6.5.3 Spin-offs

The mechanisms of IT companies creation has been analysed. It is worth pointing out that the scale of spin-offs from existing businesses is largely limited. Only academic spill-overs from universities play a significant role in industry growth. Academic spill-overs contribute to 45% of employment in IT companies in Gliwice and 27% in Cracow. In fact new companies are not usually based on the research conducted at the university. In own companies academics conduct different activities that they carried out at universities or research institutes. On the other hand, spin-offs set up by former employees of existing companies contribute largely to knowledge dissemination. Ten out of nineteen larger non-academic spin-offs identified in analysed cities, may be classified in a group of entities with a relatively high knowledge transfer (Micek, 2006b). However, the real scale of knowledge transfer can not be precisely measured due to the lack of information about 10 spin-off companies.

The main strength responsible for industry growth are new firm entries. They are usually set up by graduates or most often students. Growth of new firms lead to a need for new employees that are acquired from other companies (mostly Polish ones). New firm entries and consequently reconfiguration of staff gradually lead to knowledge dissemination.

6.5.4 Local links between firms

The demand side is the weakness of both regions. The regional market of Malopolska is smaller than in Upper Silesia. About 55% of turnover of analysed Silesian enterprises comes from contracts signed with local companies. It has led to higher degree of contacts in Upper Silesia. In Malopolska companies operate on the national and more often and common foreign markets (over 65% of turnover). Unfortunately the majority of analysed companies did not have the opportunity to be involved in bigger national contacts from Warsaw.

Concerning the subcontracting contracts The Gdansk Institute for Market Economics points out that the average level of cooperation between companies and R&D units is relatively high in IT sector. In reality the potential for cooperation seems to be significant. The cooperation really takes place in small, isolated groups of companies that subcontract out services (usually consulting or maintenance) to a limited number of companies or individual academics. However, there are no trade relations between these isolated groups of companies and individuals from universities. Some academics that manage small companies have over 10 contracts with bigger companies and simultaneously work at the university. Such range of activities enables academics to be a 'collectors and repositories of knowledge'.

It is worth mentioning that several mechanisms of knowledge dissemination in Polish IT industry may be identified. They may be classified based on the frequency of occurrence. (Table 6.3). Both business and social meetings are a very appropriate place of knowledge sharing. Events organised by providers of IT solutions are also of significant importance.

In Katowice conurbation social contacts between former colleagues are more common and natural than in Cracow. In Upper Silesia where people share mutual norms and represent commitment to a workplace, the custom of social meetings of the employees of IT companies has arisen. Mushrooms picking, pizza eating and similar activities are initiated both by enterprises and their employees. During such meetings professionals discuss emerging trends on IT market and share information about current players and their products. Sometimes even it leads to gossiping, but many managers find it very useful. Social meetings between friends facilitate the knowledge sharing and it is said among managers that they are very important in making decisions about setting up new companies.

Informal contacts, observation of other actors and gossiping plays the major role in learning process. The significance of personal contact networks of people in the industry is also undervalued.

Table 6.3 Mechanisms of collective learning and knowledge dissemination

<i>Type of mechanism</i>	<i>Cracow</i>	<i>Katowice conurbation</i>	<i>Bielsko -Biala</i>	<i>Mielec</i>
Business meetings	3	3	2	2
Learning in partners' networks (incl. strategic alliances).	1	2	0	0
Deriving from experience acquired during:				
- former work	2	2	1	2
- local internships or studying abroad	3	2	1	1
Learning through demonstration and 'follower' effects (market strategies of big companies treated as ideal behaviour on the market).	1	2	2	1
Collective learning and making acquaintances during trainings and informal events organised by providers of IT solutions.	2	3	2	0
Social meetings with friends from studies.	3	3	2	1
Social meetings with friends from work.	2	3	2	2
Formal events organised by industry associations/societies.	1	2	0	0

Note: Frequency of a given mechanism has been estimated in the 0-3 scale, where the mechanism: 0 –does not exist, 1 – rarely occurs, 2 – exists from time to time, 3 – often takes place.

Source: Author's elaboration.

6.6 Summary

To address the first aim of the chapter it seems to be that Florida's approach fits better to describe origins of learning region in Polish IT sector. Accessibility of skillful graduates who manage to win awards in international competitions in computer science is the key factor behind entries of new companies to Malopolska. The core factors of IT clusters' development are Florida's 'collectors and repositories of knowledge (universities and other R&D institutions, individual academics) that facilitate flows of knowledge, information

and ideas.' Network of companies and inter-firm relations seem to play a minor role in IT sector of post-socialist countries.

There two important obstacles to apply learning region paradigm into practice. First argument is the lack of trust among entrepreneurs that is remarkable in CEE economies (especially in emerging industries). The second question leads to the statement that the learning region approach still lacks an operational base. Invisible and immeasurable knowledge flows remain out of quantitative considerations.

The analysed concept may be attractive, but it is still very young. There yet are only few empirical studies of the learning regions in CEE countries. Furthermore, the learning mechanisms are very complex and are usually connected to the region's history. Becoming a learning region does not come about in a day. A regional policy with long-term aims must be put into practice.

Four main forms of knowledge dissemination (flows of IT professionals, informal networking, spin-offs of new companies from universities and existing businesses, 'information leakage' through links between firms and their suppliers) have been identified in a response to the second objective. To sum up, informal contacts play the major role in learning process. The significance of personal contact networks of people in the industry is also undervalued. New firm entries and consequently reconfiguration of staff gradually lead to knowledge dissemination.

In Malopolska actors of regional and local development should learn from the managers and students how to organise informal events. The role of local and regional authorities in enhancing knowledge flows should be minimised in the field of informal venues. There is the urgent need to find and support independent leaders in IT industry that may support collective and social learning. In the analysed regions it should not be done under the regional authorities' brand and their support if necessary, should be very careful. More successful networking actions may be found in Malopolska, although, on the other hand, informal contacts not initiated by governmental bodies are more common in Upper Silesia.

Regional programmes of continuous learning and retraining of technicians (e.g. electrotechnicians, civil engineers) should be introduced more widely in order to relieve a scarcity of qualified workforce.

In the analysed regions learning process should be more oriented towards enhancement of contacts between managers. Interviewees have pointed out that contacts shouldn't be steered by the regional authorities, but it must stem from managers themselves. Support regional money may help to enhance contacts, but it may play only a supportive, not a key role.

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7

Learning Regions Theory in the Practice of the Tourism Development

Vladimír Vavrečka, Enterprise plc Co., Ostrava

7.1 Introduction

Moravian – Silesian Region belongs into a group of central European regions highly marked by its history. The history of the region was formed not only by a communist regime and its strong pressure into the industrial orientation for more than 50 years. In addition people there have been used to the employment culture for more than 170 years since the steel production (1830) and coal mining began to play the principle role in the regional economy structure.

The Region has changed rapidly within last 15 years. Wide capacities of coal mining and heavy industry were closed down, tens thousands of jobs in coal mining and heavy industry disappeared, county seat Ostrava changed into green city with one of the widest offers of shopping capacities in the Czech Republic, both Beskydy mountains in the eastern part and Jeseníky mountains in the western part offer great opportunities for walking, cycling, winter sports etc. But the Region still needs a lot of effort to change not only its image but basically its structure of economy, its inhabitants' competencies and thinking etc.

One of the generally and mostly welcome approach is to support education (training, retraining, new or updated curricula in schools and universities), entrepreneurship (especially SME's) and "new economy" oriented branches with a high growth potential.

Therefore one of solutions for MSR is to utilise modern concepts and experience (learning region concept) for the branch with objective growth potential (tourism) and subjective Regional strengths (MSR location, tourism development potential – nature and mountains, spas, industrial heritage and technical matters of interest etc.) based on the World and especially European experience and best practise.

7.2 Learning Region Concept

There are a lot of potential ways how to do it. One of them is to use concept of learning region. "Learning Regions", "Learning Cities", "Learning Organisations" are terms that are increasingly used to describe the rationale for the transformation of cities, towns, regions and organisations for a knowledge

age. There are several approaches and definitions explaining the content of these terms. The challenge of competing in a global, knowledge-based economy accentuates the need to understand how the context of diverse regional and local economies influences the innovation process. The “systems of innovation” approach is used to analyze the network of relationships among firms and the broader institutional setting that supports their innovative activities; the framework emphasizes the dynamic and cumulative nature of the innovative process. Analyzing these relationships involves tracing the flows of knowledge among institutions, both public and private, that comprise this innovation system.

Over the last decade, key world policy bodies, such as the OECD, and many national governments, have come to believe that the global economy is increasingly a knowledge-based one. Since competitive success depends on the ability to produce knowledge and utilize it effectively, there is a pressing need for firms, communities, regions and nations to invest a greater share of resources into education and training than they have in the past. However, it may be more appropriate to describe the emerging paradigm as that of a “learning economy,” rather than a “knowledge-based” one. Experience from the past indicates that innovation is a social process triggered by consumers or/and “users” who engage in a mutually beneficial dialogue and interaction with producers. In this way, users and producers actively learn from each other, by “learning-through-interacting”. Learning in this sense refers to the building of new competencies, the acquisition of new skills and changing current behaviour, not just gaining access to information. The production paradigm of this “new economy” is highly dependent on localized, or regionally based, sources of knowledge and learning. Given the social nature of learning and innovation, these processes work best when the partners involved are close enough to one another to allow frequent personal interaction and the easy, effective exchange of information. Innovative capabilities are sustained through regional communities that share a common knowledge base.

The concept of learning regions has emerged to describe not only those places that offer the right institutional environment to encourage both private and social learning at four different scales: the individual worker, the individual firm, within groups of related firms, and within governmental bodies themselves, but also is connected with regions prepared for transition, for sharing experience and opinion etc. However, the literature on learning regions also contains a number of ambiguities and inconsistencies that have not been fully reconciled.

In the European context the concept of learning regions focuses more on the contributions that social capital and trust make to supporting dense networks of inter-firm relationships and the process of interactive learning. From this perspective, the social and cultural context of both the research infrastructure and the network of inter-firm relations are much more critical for successful innovation, both in the “old” and the “new” economy.

In most European contexts, the regional government and its development-related agencies play a key role in animating the regional innovation system to stimulate the learning process. Thus regional governments provide the central stimulus to spark the transition to a “learning region.” For this to succeed, however, regional governance structures must undergo a cultural and organizational shift away from traditional bureaucratic structures towards more flexible and less rigid institutional forms that can support to develop effective partnerships with private sectors organizations and associations and also develop more open and transparent entrepreneurial environment to support more collaborative approach between private sector bodies. This requires a willingness on the part of government agencies to resort less to command and control forms of imperative order and rely more consensus building and inclusiveness in the policy process. This shift in governance style is seen as necessary to promote the qualities of “institutional thickness” and “social capital” associated with “learning regions”.

7.3 Tourism as integral part of the economic development

Somewhere centuries ago a community decided to celebrate some special event and a festival was born (e.g. Colours of Ostrava). Vendors sensed that people would gather and be in a mood to buy their wares (e.g. shopping park Avion). Townsfolk realized that visitors from afar would need places to rest. Someone knew enough to organize the event and, if that person was a visionary, he knew that revellers would pay to watch the sun go down, that is if accompanying food and music were provided (e.g. Stodolni street). Vendors decided that the festival was sustainable, so they stayed on, calling the place where they gathered to do business the market (Poultry market square / Kuri rynek). The community now had a commercial centre. Dwellings that offered hospitality became inns and eating-places. This was the place where tourism was born.

The model described has not changed over time. It is a simple model of tourism development. Add the production of the goods that the vendors offer for sale; then create a strategy for community development that includes local manufacturing; and the practice of economic development, as we know it today, becomes definitive.

Tourism developers are marketers. The elements of their marketing activities include recruiting, as well as the creation of tourism products that entice visitors to linger and seek leisure activities that will part them from their money. For all practical purposes, tourism development and tourism promotion are the same things. Promotion is an element of marketing.

Economic developers are marketers also. In areas of the world where the Industrial Age has ended, there is only a semantic distinction between tourism developers and economic developers, in terms of how they function to serve prospects. Most people worldwide still think of economic development in terms of industrial development.

Economic developers oriented towards industrial development often refer to themselves as community developers when they are engaged in activities related to building local infrastructure. Economic developers often refer to themselves as product developers when they are oriented towards tourism development and similarly engaged in readying their communities. Separating economic development activities into "industrial" or "tourism" is of little importance until it causes confusion for those who own opportunities and have decisions to make that affect locations or expansions or start-ups. The smaller the community, the more important it is that the local economic developer be capable of addressing the needs of all types of prospects.

Entrepreneurs are more likely to be involved in tourism-related product development than are corporate executives responsible for relocating or expanding operations. Entrepreneurs are also more likely to be unfamiliar with the nuances of the economic development process as it relates to finding resources and assistance. In addition to entrepreneurs, investors and property or project developers are generally what make up a "whole" tourism-related prospect.

During the times of industrial development opportunity, communities promote and recruit for prospects that come neatly pre-packaged, as compared to times of development opportunity for tourism product, which are primarily commercial opportunities. Industrial prospects generally challenge a community with a standardized set of criteria that place it in a competitive position against other communities. Commercial prospects generally challenge a community to produce evidence of market potential. In essence, a community competes with itself in commercial development. If entrepreneurs seek assistance from economic developers, it is generally because they want help in putting their packages together so that they can become a whole prospect. When they call upon economic developers they often want assistance in finding sources of capital (investors) and people who can make a concept work (developers).

7.3.1 Why tourism?

The substantial growth of the tourism activity clearly marks tourism as one of the most remarkable economic and social phenomena of the past century. The number of international arrivals shows an evolution from a mere 25 million international arrivals in 1950 to an estimated 763 million in 2004, corresponding to an average annual growth rate of 6.5 per cent.

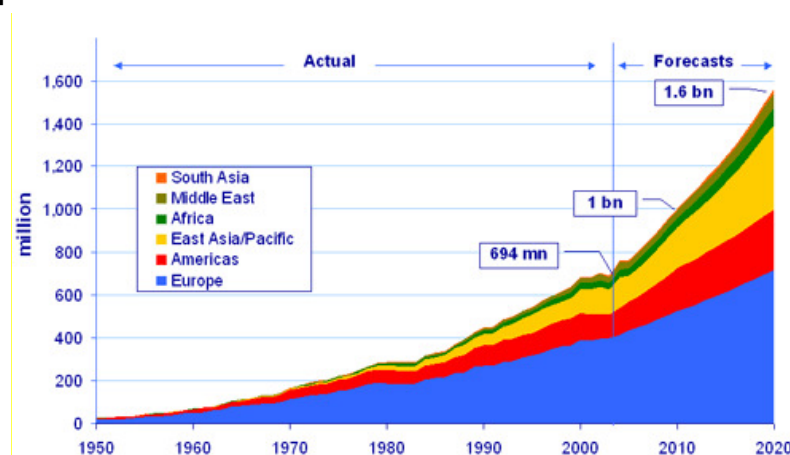
During this period, development was particularly strong in Asia and the Pacific (13 per cent on average a year) and in the Middle East (10%) while the Americas (5%) and Europe (6%), grew at a slower pace and slightly below the world's average growth. New destinations are steadily increasing their market share while more mature regions such as Europe and the Americas tend to have less dynamic growth. Europe's world share declined by almost 10 percentage points since 1950 whereas the Americas lost more than 13

percentage points. Though the Americas' performance has been most affected by the declines suffered in the past years, the fact is that its annual average growth rate for the period 1950-2000 was 5.8 per cent, also below the average for the world (7%). Europe and the Americas were the main tourist-receiving regions between 1950 and 2000. Both regions represented a joint market share of over 95 per cent in 1950, 82 per cent forty years later and 76 per cent in 2000.

Tourism 2020 Vision is the World Tourism Organization's long-term forecast and assessment of the development of tourism up to the first 20 years of the new millennium. An essential outcome of the Tourism 2020 Vision are quantitative forecasts covering a 25 years period, with 1995 as the base year and forecasts for 2000, 2010 and 2020 (graph 7.1).

Although the evolution of tourism in the last few years has been irregular, UNWTO maintains its long-term forecast for the moment. The underlying structural trends of the forecast are believed not to have significantly changed. Experience shows that in the short term, periods of faster growth (1995, 1996, 2000) alternate with periods of slow growth (2001 and 2002). While the pace of growth till 2000 actually exceeded the Tourism 2020 Vision forecast, it is generally expected that the current slowdown will be compensated in the medium to long term.

Graph 7.1: Tourism 2020 Vision Forecasts



UNWTO's Tourism 2020 Vision forecasts that international arrivals are expected to reach over 1.56 billion by the year 2020. Of these worldwide arrivals in 2020, 1.2 billion will be intraregional and 0.4 billion will be long-haul travellers.

The total tourist arrivals by region shows that by 2020 the top three receiving regions will be Europe (717 million tourists), East Asia and the Pacific (397

million) and the Americas (282 million), followed by Africa, the Middle East and South Asia.

East Asia and the Pacific, South Asia, the Middle East and Africa are forecasted to record growth at rates of over 5 percent per year, compared to the world average of 4.1 per cent. The more mature regions Europe and Americas are anticipated to show lower than average growth rates. Europe will maintain the highest share of world arrivals, although there will be a decline from 60 per cent in 1995 to 46 per cent in 2020.

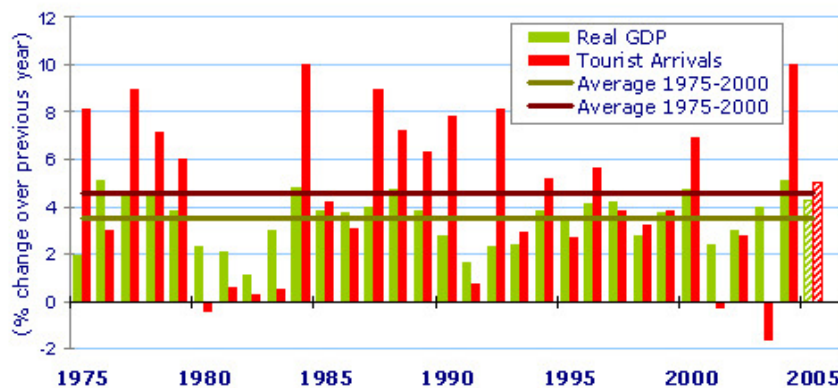
Long-haul travel worldwide will grow faster, at 5.4 per cent per year over the period 1995-2020, than intraregional travel, at 3.8 per cent. Consequently the ratio between intraregional and long-haul travel will shift from around 82:18 in 1995 to close to 76:24 in 2020.

International tourism receipts represented in 2003 approximately 6 per cent of worldwide exports of goods and services (as expressed in US\$). When considering service exports exclusively, the share of tourism exports increases to nearly 30%.

Tourism demand depends above all strongly on the economic conditions in major generating markets. When economies grow, levels of disposable income will usually also rise. A relatively large part of discretionary income will typically be spent on tourism, in particular in the case of emerging economies. A tightening of the economic situation on the other hand, will often result in a decrease or trading down of tourism spending.

In general, the growth of international tourism arrivals significantly outpaces growth of economic output as measured in Gross Domestic Product (GDP). In years when world economic growth exceeds 4 per cent, the growth of tourism volume tends to be higher. When GDP growth falls below 2 per cent, tourism growth tends to be even lower. In and GDP at 3.5 per cent, i.e. tourism grew on average 1.3 times faster than GDP. the period 1975-2000 tourism increased at an average rate of 4.6 per cent a year (graph 7.2).

Graph 7.2 Economic Growth (GDP) & International Tourists Arrival



Source: World Tourism Organization; International Monetary Fund

7.3.2 Tourism Trends for Europe

The **European Travel Commission (ETC)** has revised its document '**Megatrends of Tourism in Europe to the Year 2005 and Beyond**' on the basis of ongoing discussions with its members - the National Tourist Offices (NTOs) of Europe - and advice from the **European Travel & Tourism Action Group (ETAG)**, whose members comprise international organizations representing the key tourism industry sectors.

7.3.3 Changes in society - new ways of travel

Society changes continuously, and trends - whether economic, social or lifestyle - subsequently impact on tourism, as tourism is an integral part of our society. It is important for the tourism sector to assess these changes at an early stage. Existing policies regarding products and services, marketing and investments, all demand appropriate adjustments or adaptations when preferences and behaviour develop differently from the way they have done in the past.

In the past, supply has always dictated demand, whereas today the reverse is true. Increasing saturation of the market and more self-assertive consumers, with more free disposable income and leisure time, determine the profitability of suppliers in the tourism sector. Competition is becoming more volatile. Although some trends are supply-funded, it is also important to forecast trends in demand, as these trends form the basis for determining the time and money required to make the relevant adjustments.

In this overview, we consider trends to be future developments that differ significantly from the past - both quantitatively or qualitatively. The main objective of this analysis is to support suppliers in their longer-term policy making. the trends mentioned related to Western Society - and to Europe in

particular for the next few years. They are based on various quantitative and qualitative trend analyses and assessments made by leading international tourism experts.

Finally, analysing trends leads us to the conclusion that every trend creates a counter-trend. Furthermore, it should be stressed that, in many cases, trends are mixed: Mixed in terms of their phase of development, mixed in results and mixed in the level of importance. Given this fact, it is nearly impossible to isolate tourism development into single trends alone.

7.3.4 Trends

Demography

The number of persons in older age categories will rapidly increase. Seniors will be healthier and will have higher disposable incomes than in the past. Many of them will enjoy early retirement schemes.

In view of this development, the number of more experienced senior travellers will increase faster than the development of tourism demand in general (although a gradual downgrading of pension benefits, and a trend to increase the pensionable age may slow down this development in the long run).

Consequences for the tourism sector:

1. Increasing demand for quality, convenience and security.
2. Increasing demand for easy transportation.
3. Increasing demand for more relaxing entertainment facilities (e.g. golf courses etc.).
4. Increasing demand for one-person products.
5. More demand in shoulder months.
6. In marketing, less emphasis should be put on age and more on comfort.

The average number of persons per household will decrease still further, which will result in higher disposable incomes and spending power. For tourism, this will influence demand in general, and demand for long-haul travel and short breaks in particular.

Consequences for the tourism sector:

1. Increasing demand for luxury ('small indulgences').
2. Increasing demand for special products which can be obtained on impulse.

3. Increasing demand for city-breaks and other short breaks abroad - in periods that used to be less favoured.
4. Higher level of interest in winter sun holidays.

Health

Health-consciousness will increase still further. Though increasing health-consciousness will not influence the volume of demand, it will certainly influence the decision-making with regard to destinations, and behaviour during holidays.

Consequences for the tourism sector:

1. Destinations that are perceived as less healthy will be more quickly avoided than in the past.
2. The demand for sun-holidays only will decrease still further.
3. Active or activity holidays will increase in popularity, and the demand for facilities that correspond to this type of holiday will be increasingly preferred
4. The demand for 'wellness' products will increase, including spas and fitness centres.

Awareness & Education

The average level of education is increasing. This will result in holidaymaking in which the arts, culture and history play a more important role, including more educational and spiritual holidaymaking.

Consequences for the tourism sector:

1. Increasing demand for special products.
2. The more prominent inclusion of elements relating to the arts, culture and history in package tours and self-organised holidays.
3. The need for better and more creative communication of information.
4. Demand for new destinations in Central and Eastern Europe will increase.

Leisure Time

Modern society exerts increasing pressure on peoples' daily lives, and stimulates the wish for more leisure time and relaxation - which will have an

adverse effect on the increase of free disposable incomes. For tourism, this trend is thus by definition unfavourable - also because the increase in the number of days of paid leave for holidaymaking has come to a halt.

Consequences for the tourism sector:

1. An increasing need to supply additional low-cost products.
2. An increasing need to offer relaxation.
3. A shortening of the longer main holiday in favour of more short ones.

Travel Experience

More sophisticated consumers are increasingly self-assured regarding their needs and rights. For tourism, this results in an increasingly critical attitude to quality, and to the price-quality ratio.

Consequences for the tourism sector:

1. Alternative ways of spending time and money will increasingly compete with holidaymaking, and within holidaymaking the preferences for destinations and accommodation.
2. Destinations that do not meet up to acceptable standards will suffer more intensely, and for a longer period of time in future.
3. More mixed behaviour: this holiday simple, the next one luxurious - this year long-haul, next year short-haul.
4. Holiday preference will become more fragmented in future, and thus influence repeat volumes.
5. Destination fidelity will continue to decrease over the years.
6. More experienced tourists will increasingly result in a more critical attitude to the artificial, in favour of greater authenticity - in particular with reference to emotional satisfaction and the need to personalise; artificial supply that does not distinguish itself from others (e.g. theme parks) will decrease in importance if it does not meet with higher standards.
7. Experience and critical attitudes will stimulate tourists to revisit satisfactory destinations from their travel past.
8. The increasing preference for mobility will stimulate rentals of vehicles.

9. Regions that offer a full, varied, totally balanced concept will be increasingly preferred, and will demand better destination management.

Lifestyles

Lifestyles in Western society change gradually. For tourism, this influences the tourist's perception of his/her personal needs and behaviour.

Consequences for the tourism sector:

1. Though relevant investments may be made, the interest in 'Bed & Breakfast' is lessening, since it is regarded as cheap.
2. As 'status' is less important than it used to be, leisure behaviour is becoming more personalised, leading to increased demand for smaller sized accommodation units (like smaller authentic family hotels and tourist farms).
3. The shift in perception regarding life and lifestyle results in a decline in the demand for fully escorted tours.
4. Suppliers will benefit more if they are able to create completely new products, concepts and services that distinguish themselves by their added value.
5. Increasing specialisation by suppliers in relation to specific hobbies and interests will become more important, and will more often be combined with holidaymaking.
6. The increased preference for solid 'anchors' as secure holds in a more uncertain world stimulates the wish to possess second homes, also in areas close to smaller regional airports.
7. The trend of 'back to basics' results in preferences for more simple holidays: from hotel to bungalow, from caravan to tent.

Information Technology

The penetration of the internet - and its use for information and the purchasing of tourism products and services - will continue to increase. For

tourism, the role of the internet - including new means of visual presentation - will increase still further, and will prove to be of the utmost importance in future.

Consequences for the tourism sector:

1. The ready availability of tourist information on destinations and products, and increasingly sophisticated search engines to analyse such information will lend itself to comparison, and thus influence competition more intensively via 'grazing'.
2. Experienced tourists will increasingly put together their own holidays on a modular basis with direct bookings.
3. The role of travel agents will decrease, as full package tours are increasingly bought directly via the net.
4. Internet will transform the classical role of the National Tourism Organisations (NTOs) and Tourist Boards at an increasing speed - but will create a new role in e-marketing, including the application of Customer Relation Management (CRM) destination marketing.
5. Destination marketing (e.g. better branding with public support) will increase in importance as the source to stimulate website visits.
6. The availability of in-depth information on suppliers' products, either on the destination site or accessible through links, will become of more importance as the basic precondition for the success of websites.
7. The possibility of 'shopping' via the internet will stimulate later bookings.
8. The growing need for secure online reservations has to be stressed in relation to more experienced and self-assured tourists.

Transportation

The increasing availability of high-speed trains and low-cost carriers will influence classical travel flows. Road traffic will face more congestion.

Consequences for the tourism sector:

1. Destinations will increasingly benefit from easy and affordable access for short breaks - in particular when major events are organised outside of the main season.

2. The increasing availability of direct links by train and plane will stimulate demand for international short breaks in cities and city regions, to the detriment of rural areas.
3. The use of high-speed trains for medium distances will take over a large proportion of the travel currently undertaken by scheduled airlines.
4. Road congestion will negatively influence transport by private car - in particular in the high season.
5. Coach trips will decrease in importance.
6. Barriers which result from non-adapted schedules or inter-modal transportation which is not optimally connected will have a stronger negative influence on destinations that cannot meet the growing wish for easy accessibility.
7. Cruises - not only expensive cruises, but also those in 'budget-class' - will increase in popularity, in particular for those over 50 years of age.

Sustainability

Environmental consciousness will continue to increase. For tourism, this will result in more demand for sustainable destinations, in which nature and population will play an increasingly prominent role. In order to mitigate the costs for sustainability, the price will increasingly be passed on to the tourists themselves.

Consequences for the tourism sector:

1. The regional component in destinations will increase in importance.
2. Destination management policies need to be improved through more coherent and consistent planning.
3. The preference for destinations will be more strongly connected to the support given by the local population to welcoming increasing numbers of visitors.
4. Regions which have suffered from overbuilding (particularly where this is not in keeping with the natural landscape) will increasingly be rejected as attractive destinations.
5. Eco-tourism should not be confused with sustainable tourism.

Safety & Security

Acts of terrorism, regional wars, pollution and other crises have unfortunately become facts of daily life, and influence the need to feel safe and secure. In tourism, this results in an increased need for safety and security, and in tourists avoiding destinations that are perceived as unsafe.

Consequences for the tourism sector:

1. The quality of water (in lakes and pools, but also of tap water) will increase in importance in the selection of the destination, and demands better protection.
2. The more critical tourist will more quickly make claims if the product offered does not meet up to the expected standards.
3. The costs for guaranteeing safety and security will rapidly increase.
4. The industry should be better prepared to meet tourism demand more flexibly in periods of crisis.

7.4 Regional Tourism Development

Tourism has become more comprehensive, more complex and highly competitive industry in last 2 decades. Successful regions have their own “prescriptions” for tourism development. To be successful means to differ from competitors. But also one common approach has appeared during last years – destination management.

7.4.1 Trend towards Destination Management Organizations (DMOs)

According to the WTO Business Council, the current trend in almost all regions of the world is towards semi-public but autonomous tourism organizations involving a partnership with both private sector and regional and/or local authorities. Over the last decade, as far as travel and tourism is concerned, the roles and responsibilities of governments as well private sector and society in general have significantly changed from the situation where the state had the key responsibility for tourism development and promotion to a world where the public sector is obliged to reinvent itself by relinquishing of its traditional responsibilities and activities in favour of both provincial/ state and local authorities indicating the growing influence on the behaviour of governments and business in general. The trend towards decentralization of tourism management and promotion as well as towards public-private sector partnership, according to the WTO Business Council, have raised the need for new, flexible and multi-disciplinary approaches to destination management. In

terms of definitions, a destination is geographical space (a cluster) in which the entire tourism experience takes place. Although national policies normally encourage tourism competitiveness, an efficient collaborative partnership involving key stakeholders is needed to enhance a destination's attractiveness, marketability, sustainability and service quality.

7.4.2 Destination Management

Managing tourism destinations is an important part of controlling tourism's environmental impacts. Destination management can include land use planning, business permits and zoning controls, environmental and other regulations, business association initiatives, and a host of other techniques to shape the development and daily operation of tourism-related activities.

The term "destination" refers broadly to an area where tourism is a relatively important activity and where the economy may be significantly influenced by tourism revenues. Destination management is complicated by the fact that a single, recognizable destination may include several municipalities, provinces, or other government entities - in island environments it may be the entire country.

Participating governance structures led by local authorities, with the involvement of local NGOs, community and indigenous representatives, academia, and local chambers of commerce, make up what are known as "Destination Management Organizations" (DMOs). Often DMOs take the form of local tourism boards, councils, or development organizations. The network of local tourism businesses (hotels, attractions, transportation services, service providers such as guides and equipment rentals, restaurants, etc.) are also a significant part of a destination.

According to the Monolingual dictionary, MMR CR 2002 the „**Destination management** is a set of techniques, instruments and measures applied in the coordination of the planning, organization, communication, decision making process and regulation of tourism in the given destination. The result of such a process are the sustainable and competitive products of tourism, the commonly shared logo, quality mark, the joint (shared) information – reservation system, the creation of price policy, the carrying out of research and the collection of statistical data from the area of tourism, the partnership initiation of the private and public sector of tourism and the support of professional associations, associations and organizations. Part of destination management is visitor management, LAC model and the so called spectrum of recreational opportunities.”

The implementing body should be an organization / company, which is defined in the same dictionary in the following way: “**Destination Management Company**” (DMC) - the organization aimed at destination management in the area of the creation and assertion of destination and its products of tourism on the market, which realizes the intentions of destination management. DMC is

oriented on the development and active sale of main products, coordinates and manages the creation of tourism products, the price policy, and active sale of destination. DMC is usually supported or created by main service providers in destination.”

We do not consider these definitions as a dogma, but rather as starting positions for harmonizing the notions of the series of the subjects, interested in tourism in the region, and similarly in services of destination management of the region of Northern Moravia and Silesia.

If we proceed from the partnership principle, so then the real activity of destination management and its partners will unequivocally show its optimal shape for the conditions of the given region. In any case, the essential principles of the activity of destination management should be:

- Respecting and supporting of the partnership principle, that is such relations, which are mutually beneficial for the participated parties, the relations, which are not a priori bound by the commercial contracts or efforts concerning monopolization or misusing of the certain position;
- Respecting and supporting of the already existing ones, positive results of the beneficial relations, structures and work division in the sector of tourism in the region;
- Trust among the cooperating partners and mutual advantage of their cooperation;
- The differentiated approach to the individual parts of the region, originating from the needs, specifications and development potential of these sub-regions, and their identified potentials of tourism should be mainly the instruments for the preparation of tourism products;
- Maximal orientation on the consensual approach in solving the fundamental issues of the development of tourism in the region;
- Maximal orientation on the nationwide (the entire region) perspective on the sector of tourism and its developmental needs.

There are various forms of destination management existent, in dependence on:

- The types of cooperation

- informal
- institutionalized
- status of the cooperating subjects
 - entrepreneurial
 - DM public models
- Geographical destination level
 - local/regional level (tendencies towards public models)
 - national level (tendencies towards entrepreneurial models)

7.5 Conclusion

The needs, expectations and anticipated benefits of tourism vary greatly from one destination to the next, and there is certainly no "one size fits all" approach to destination management. As local communities living in regions with tourism potential develop a vision for what kind of tourism they want to facilitate.

The concept of "learning regions" should generally effectively assist for the tourism development and its management. The concept of "learning regions" is definitely able to assist the Moravian-Silesian Regional development and could play one of the basic roles in the regional tourism development.

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8

Learning Regions, Innovations and Universities²⁹

Oto Hudec, Technical University of Košice

Gabriela Kol'vecková, Technical University of Košice

8.1 Introduction

The main objective of the article is to investigate the linkage between the region, its development, and education as a key factor influencing the labour market of the region. Another objective is to depict the role of the university as a tool in the regional development illustrated in the educational market in Slovakia. It is pointed out that the “balance of academic trade” is a dilemma for Eastern Slovakia, “exporting” plenty of students and graduates, to western regions and countries. The fluctuation of the labour market, missing skills of the graduates from the point of view of employers’ expectations and other topics are dealt with in the subsequent part.

After having answered the question - are innovations an impetus for learning or vice-versa?, we turn our attention towards research and development (R&D) that is an indivisible part of a university mission. Košice self-governing region (KSK) is showing willingness in implementing a regional innovation policy in order to keep a highly qualified labour force in the region. Košice region is examined in terms of university learning with an emphasis on students and their entrance into the labour market after graduation. All that is seen in through the perspective of innovations and the regional innovation paradox.

8.1.1 Learning Itself

- “We learn because we have to.”
- “Learn, so you can be enrolled into university!”
- “Study, in order to keep pace with technological developments.”

²⁹ Acknowledgements.

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Those are the frequent phrases linked with the term learning in east Slovakia. Perhaps this perception of learning is just a defence posture sustained from the former regime struggling to plan the future of its citizens. There is a difference between objective and motivation. Each learning procedure has got its objective and motivation. The motivation ought to be a long-term goal, while the objective is a short term one. It is obvious that daring ideas need lots of effort and long-term planning is impossible without numerous "small" goals.

Smith already answered the question "Why do I learn? "It is either egoism or sympathy that stands behind the economic activities"³⁰. Learning is one of it, is it not? Some would object that people in the area do possess enough motivation and enthusiasm, but the capacity to learn is limited (as the law of scarcity is valid). Therefore the demand for learning is dependent on people's flexibility and attitude towards learning new ideas or even change of the habits. It is up to key regional institutions (university among others) to foster this flexibility by giving examples and thus shift the frontier of the capacity to learn.

8.1.2 To Learn what is the Learning Region

The phrase "learning region" is accredited to Richard Florida³¹. After his introducing the notion many authors have taken it up, although from various perspectives. The results presented in this paper refer to the learning region as a tool. To explain this, the definition of learning region by Asheim³² (2001) is borrowed; it is "Increasingly organized co-operation with a broader set of civil organizations and public authorities that are embedded in social and regional structures."

Thus an appropriate tool is a network of institutions based on a partnership that fosters development strategies. Providing that most of the institutions and people living in the region are seeking a higher quality of living then the learning region seeks the possibilities and uses the strengths, competitive advantages related to informal social networks, which are mostly built during high school or university. By using networks the learning region turns to be flexible and creative in adopting new ideas that were approved by open-minded institutions and are to be carried out by leaders who possess the spirit of entrepreneurs.

³⁰ "Because the entrepreneur follows his/her own egoistic interests thus (s)he is producing more altruism than (s)he would have deliberately wanted" (Smith In: Rankin, 1998)

³¹ Florida is currently the H. John Heinz III Professor of Regional Economic Development at Carnegie Mellon University in Pittsburgh, PA, USA.

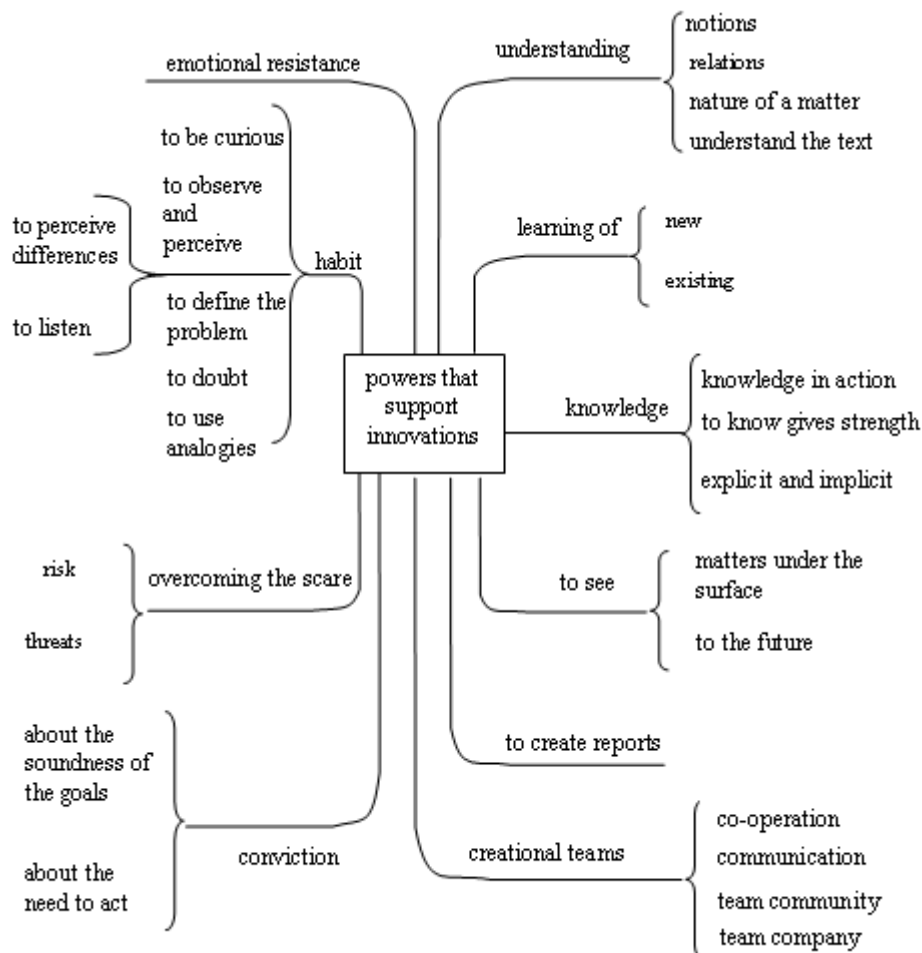
³² Asheim, G. B. is professor of economics at the Department of Economics, University of Oslo. Asheim, G. B. (2001) Globalisation: A Challenge for Local Industrial Policy. *Canadian Journal of Regional Science/Revue canadienne des sciences régionales*, XXIV:1, (Spring/printemps 2001), 101-120., [online] Published 2001. [26.05.2006]. Available at <<http://www.lib.unb.ca/Texts/CJRS/Spring01/ISAKSEN.pdf>>.

8.1.3 Learning versus Innovations

Innovation and learning are intertwined and it might be very hard to say which happens first. However, new linkages can challenge the theory or models in place, by modifying them, expanding them, or connecting them to other pre-existing concepts or models. This process generates additional learning again. So that innovation is generally sandwiched by new learning. Regeneration of a region is supposed to be realised through a greater emphasis on learning and innovation.

One of the risky issues of the learning region is migration. The brain drain is the other side of mobility nowadays, especially concerning R&D intensive industries, which causes a lack of professionals in specific areas. More about the connection of learning and innovations is “told” behind chart 8.1 that exhibits learning and its elements as the powers of innovations.

Graph 8.1 Map of the powers.



Source: Adapted from Tureková, H. (2005).

The learning region is based on the understanding that economic growth is at present dependent on innovation and at the same time, innovation is dependent on the creation, dissemination and application of knowledge.

8.2 Regional Innovation Paradox

The regional innovation paradox “shows that there are strong complementarities between business, education and government spending on R&D and that technology /innovation policy and industrial policies tend to work in opposite directions.” (Oughton, Landabaso, 2004)³³

Another irony of unlearning might be added. The old-fashioned manners of backward regions must be “unlearned” and the new ones embedded.

This is truly the core of learning better, to say changing people’s minds, sometimes suspicious, needing a lot of help to convince and got changed in their habits. So the routine is a false friend and invention is welcomed. Good conditions for the shift from invention to innovation are being promoted by understanding the rule, which might be expressed as “learn to learn”.

Thus it is people, who are innovative, not computers or machines. People need to perceive the reality by all senses and above all they need up-to-date information. Behind this innovative thinking are the human specifics of Information Management that can be briefly summarized.

1. Imagination and creativity are latent in the human mind.

This specific warns us. In order to prevent routine behaviour we have to refresh perpetually and constantly the basic premises of the best practices that are stored in the knowledge database of each organization.

2. The release of the tactical dimension of knowledge creation.

The transfer of knowledge is personal and it is difficult to formalize it and express it. Nonaka and Takeuchi (Nonaka a Takeuchi 1995 In: Malhotra, 2000)³⁴ suggest that knowledge is created in four ways: (1) by socializing, (2) by externalization, (3) by the combination and (4) internalization.

³³ Oughton, Ch. – Landabaso, M. The Regional Innovation Paradox: Innovation Policy and Industrial Policy. Birkbeck, University of London. School of Management and Organizational Psychology. Research. Working Papers. [online] Published 2004. [10.4.2006]. Available at < http://www.bbk.ac.uk/manop/research/wpapers/mandocs/00_04_oughton.pdf >.

³⁴ Malhotra, Y. Knowledge Management & New organization Forms: A framework for business model innovation. BRINT Institute. The knowledge creating company. [online] Published 2000. [19.04.2004]. Available at <<http://www.brint.com/members/01030526/businessmodelinnovation/>>.

3. Subjectivity and the creation of views is the basis for the creation of knowledge.

The decrease of immoderate simplification and premature, rushed decision-making is expected by investing into multiple and various interpretations. This will be allowed by Kant's or Hegel's way of obtaining information.³⁵

4. Constructive aspects of knowledge creation and its renewal.

For many non-traditional situations it is hard to assure the only interpretation of the best practices that are to be found in the database, because the information is created by individuals in the process of the data use.

In general, knowledge as well as innovations are in progress in several forms:

1. continual, i.e. small incremental changes (learning-by-doing),
2. discontinual, i.e. radical changes (non-routine learning),
3. huge shift in technology sometimes called technology – economic paradigm.

As for the incremental changes the role of the university is worth considering, while radical changes are rather the firm's role. The huge shift is up to both groups of actors that have to get together to achieve that shift.

8.3 University as a Learning Tool for a Region

It is believed that success in industrial and technological development is based on knowledge existing and generated at the ground of universities. A highly significant role is played by universities, particularly regional universities in regional development. A university located and operating in a less developed region, although regarded as an autonomous institution, is naturally aware of its responsibility to the region.

An increasing interest has emerged in literature, which focuses on the importance of knowledge, learning and innovation to the economic success of firms, regions and nation-states (Lundvall 1988; Kanter 1995, Forrant 2001, etc.). The changing role of universities in that context is becoming one of the

³⁵ Kant's information system (IS) observes explicit views on complementarity of the character of phenomena. According to Hegel's IS are used repeated and contradictory interpretation of key information, which secures that so-called best practices will be the subject of permanent observation and improvement. Dialogue is the most useful method for looking after the information.

main issues, including universities as political and economic players in regional and local governance structures.

Currently the role of universities in regional development is considered as going beyond this narrow technical and economic approach to understand the role of universities as more integrated. Hence, improving the stock of human capital within a region (i.e. taking responsibility for that) is a new responsibility of universities. Negotiating and building alliances and partnerships, among different local and government institutions located in the region, universities, private sector interests and non-profit institutions is a crucial task but hard to manage. The situation is even more vivid in the former communist countries of Central and Eastern Europe, facing the heritage of centrally planned economies, still learning strategic planning at the regional and local level and a hard lesson of partnership building and maintenance. Thus, both municipality and university shift from being an arm of the national welfare state, or national research and education institution respectively, to a new common role of being an accelerator of local co-operation and policy innovation.

8.3.1 Regional Affiliation of Universities

The issue of the role of universities in regional development has been traditionally concerned with two issues: the economic effect of direct employment of staff and student spending in the local economy, and technology transfer, particularly through the creation of spin-off companies and the establishment of science parks (Goddard 1994, Van der Meer 1996). Currently the role of universities in regional development is considered as going beyond this narrow technical and economic approach to understand the role of universities as more integrated. Improving the stock of human capital within a region (i.e. taking responsibility for that) with their engagement in the learning region is a new responsibility of universities.

Universities, particularly regional universities, are believed to play a highly significant role in regional development. It is evident and common, they are often one of the major contributors to regional economies, major regional employers and purchasers of services. Because they also provide cultural, sporting and physical infrastructure in their region, regional and rural universities and campuses are important service providers for their regions. Students and teachers are among the most important target groups for airlines, internet providers and computer and software companies, etc.

The universities engaged in their region's development, taking seriously their participation in regional partnerships are usually those relatively large-scale universities located in underdeveloped or peripheral regions. If a university is located in an underdeveloped region, the regional context is becoming particularly more central and it belongs to regional key players.

On the other side, according to worldwide respected academic freedoms, universities have no formal responsibility to their regions. University is regarded

as an autonomous institution, and regional engagement is still the decision of university authorities. A high level of autonomy resulting from academic rights causes at the same time a barrier for fostering greater cooperation. Of course, academicians are present in all kinds of regional networks. There are many community members appointed to university governing bodies and vice versa, but more often in an individual capacity rather than as representatives of their organisations. Higher education institutions have been predominantly created and funded by national governments to meet national labour market needs for a skilled labour force and to provide a capacity to meet national research and technological development needs. A regional agenda from that point of view is a relatively new element in universities' policy.

8.3.2 University Mission

Each university is developing its mission in the creation and dissemination of knowledge across a wide range of subjects in an international, national and regional context. Hence, it always causes tension between the situation of a university in its region and also its engagement towards teaching and research in a national and international context. In this sense, a view from the university is that it can best serve the region by being an international well respected research-based institution. In that sense, universities better define themselves as international research institutions also offering (some) economic, cultural and social support to the local community.

Universities always need to differentiate between opportunity and responsibility. In the current funding environment, universities are being encouraged to operate as much as possible like a profit-oriented business – entrepreneurial universities. Such a tendency can have a positive impact on the engagement of universities into the regional and community framework. And universities can find absorbing demands for their “products” in their corresponding regions. Responding to these demands clearly causes managerial, structural, social and marketing problems for traditional academic environments.

Formal (and informal) academic networks are typically not disposed towards restructuring or vital decisions. Often, informal rather hidden or for an outsider less obvious links allow innovative ideas to launch and overcome old practices. Academic stereotypes are rather tough, and the willingness to change them is often eliminated and thwarted from the very beginning.

On the other hand it is supported by the assumption of academic freedoms and freedom in democracy as well as the *laissez-faire* in economics. All this nourishes the altruism both pure and above all impure³⁶. When a university is

³⁶ The understanding of altruism is different, we can distinguish two poles: “pure altruism, where the actual act of giving improves the welfare of the giver, and impure altruism, where the improved welfare of the recipient is a term in the utility function of the altruist” (Wicinas, 2001).

linked with both worldwide networks and local environments, it must have a sense of both the global and the regional. To be able to play as a credited actor and having a fruitful partnership it also needs to be flexible and open-minded. This flexibility and open-minded approach supports the rise of new and potentially different products or services that are to become an advantage of the region and its actors, providing that the key players are able to commercialize the advantage.

Examples of engagement in the regional learning process include programmes of continuing and professional development to improve the skills of local managers, targeted training programmes and research links to existing and proposed global businesses, providing a gateway to the global knowledge base for SMEs, etc. Providing regional strategic analyses and even leadership within local civic society is becoming an ambition of many higher education institutions.

8.3.3 University and Regional Labour Market

For the development of a region, the regional community and the university need to work together effectively in the sense of preparing graduates for the needs of the regional economy and to educate a highly flexible workforce. Universities might play more a central role in terms of developing a lifelong learning agenda in their regions rather than producing only graduates through the traditional 5-year degree courses.

Meeting the demands of SMEs remains one of the main problem areas in terms of skills and education provision in the regional economy. Regional enterprises always expect that university should incorporate very practical skills into the curricula, since SMEs do not have enough resources, personnel and time to undertake skills training. As a result, there is often a large mismatch between the needs of SME's and the skills of graduates. There is a general insight from the regional community that the region's universities should fulfil more specifically the requests of the regional economy.

University is rather obviously paying attention to a production culture (selling what you make) than a market culture (making what you can sell). The curricula at the universities are created on a longer-term basis compared to the, perhaps, shorter-term needs of the regional market.

Universities build up successful and regionally fitting technology transfer mechanisms contributing to regional economic progress. Knowledge Houses, Science/Research Parks, offering services to clusters of innovative firms, are considered a front door for SMEs who want to access a university's expertise. Those mechanisms are also useful ways to develop relationships between academics and industrial partners and both are cited as examples of best practice for regional commitment.

However, a lot of members of both partner sides conclude that the university is not capable of meeting the needs of the region's SMEs.

8.3.4 Development of the Educational Sector in Slovakia.

Similarly to other countries in transition from a centrally planned economy to a market economy, former Czechoslovakia reflected after the political changes in 1989 the necessity of renewal of the educational and training system. The political-societal and social-economic changes, which took place in Slovakia have logically resulted also in fundamental changes in the field of education and training, and its management as well.

The transition process started substantial changes in their educational systems and still it is not yet brought to a conclusion. The Slovak Republic might accommodate in that respect as an example representing Central European countries as Poland, the Czech Republic and Hungary, although there exist various distinctions among them. New acts changed the mission and position of higher education institutions, and unambiguously specified their self-governing status, fundamental academic rights and freedoms and the right to freely elect their self-governing bodies, etc.

After 1989, the opening of the educational market, the waiving of engineering courses support and protection, together with the decline of industry has recalled a lack of interest in engineering studies. Decreasing demand for engineering studies and the subsequent drop in the quality of students caused technical higher education institutions to start to humanize engineering studies by introducing interdisciplinarity as a main tool to keep the same number of students. The former Marxism – Leninism courses have been replaced by courses like languages, sociology, psychology, law, ethics etc.

While more than 50% of female students in Slovakia are following so-called “women-professions” such as social sciences and humanities, economics and business administration, pedagogy, etc., naturally results in a much smaller percent deciding for studies in engineering. Following the statistics of the last 5 years, there is approx. 30% of female students in engineering, while in electrical engineering the share is following European numbers - 4%. The most popular faculties at the present time are those offering Economics and Business Administration courses - 57% female students.³⁷

The educational sphere is still in growth according to the number of students and also the number of HEI (higher education institutions) and their faculties. The following Table illustrates the development of the number of HEI and their faculties in the last 5 years.

³⁷ Statistical Office of the Slovak Republic

Table 8.1 The Number of HEI and their Faculties

<i>Number of bodies</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>
<i>Higher Education Institutions</i>	23	23	24	25	27	28
Public	18	18	19	19	20	20
State	3	3	4	4	3	3
Private	2	2	1	2	4	5
<i>Faculties – type of</i>	96	96	103	107	113	114
University	40	40	46	49	55	55
Technology	18	18	19	20	21	21
Economics	16	16	16	16	19	20
Agriculture	7	7	7	8	8	8
Arts	8	8	8	8	8	8
Military and Police	7	7	6	6	2	2

Source: authors

Although the number of technology oriented faculties slightly increased the number with the most important indicator describing the situation in the engineering education is the following:

Table 8.2 The Proportion of Technology Students

<i>Year</i>	<i>Proportion of technology students</i>
<i>1989</i>	45.3%
<i>1993</i>	35.9%
<i>2004</i>	13.9%

Source: authors

The following table describes the recent trends in all the fields of study in the Slovak Republic.

Table 8.3 Number of Full-Time Students in Public Higher Education Institutions in 2000 – 2004 by Field of Study

<i>Field of Study</i>	2000	2001	2002	2003	2004
<i>Natural sciences</i>	1 437	1 168	1 475	2 047	1 177
<i>Change</i>	1 043	181	-143	572	-870
<i>Technology</i>	5 133	5 846	6 958	8 139	7 004
<i>Change</i>	2 016	713	1 112	1 181	-1 135
<i>Agriculture</i>	2 237	2 725	2 728	3 098	2 836
<i>Change</i>	226	488	3	370	-262
<i>Medicine and Pharmaceutics</i>	1 205	1 368	1 911	3 891	3 667
<i>Change</i>	768	163	543	1 980	-224
<i>Humanities and Social Sciences</i>	27 993	32 761	31 317	33 683	34 566
<i>Change</i>	4 912	4 768	-1 444	2 365	884
<i>Arts</i>	374	656	56	673	266
<i>Change</i>	306	282	0	17	-407
<i>Military and Police sciences</i>	214	0	460	584	851
<i>Change</i>	82	0	0	124	267
<i>Total</i>	38 593	44 974	45 505	52 114	50 367
<i>Change</i>	8 353	6 595	71	6 609	-1 747

Source: Statistical Yearbooks of Education SR (1999, 2000, 2001, 2002, 2003, 2004)

8.3.5 Specific Situation in Engineering Education (Second Choice Effect)

The transition has abolished the system of quotas determined by the former governments. That opened the chance for those not having a chance to be admitted to study branches such as law, business administration, etc. and the engineering HEI have been confronted with the lack of interest in the engineering fields, a decrease of interest, motivation and quality of their applicants. And the trend coming from the demand side (applicants, students) has been reinforced by the collapse of the former industry (heavy, special, mechanical), phenomenon of unemployment and firing technical staff and engineers. The reaction of the engineering faculties was very natural and

similar – to survive bad times by keeping up the same numbers of students with a loss of quality of their students on the other side and by offering more attractive (translate as interdisciplinary) study programmes.

The interdisciplinarity of engineering courses became a solution to attract students as an important precondition has been fulfilled: The engineering degree was very often only the second choice as a substitute for business administration, social sciences, humanities, law, etc.

A structured questionnaire survey has been realised for three groups of respondents to be able to compare their opinions on questions dealing with interdisciplinarity courses strategy: academics, students, professional sphere – answers were received from female engineers. In the questionnaire respondents indicated their answer by using a numeric scale (number 1 – not important, number 5 – very important).

The hypotheses about interdisciplinary courses and the differences among the three groups studied have been studied by asking several questions.

The hypotheses tested in the INDECS project have also been proved in the project of the 5th EU-Framework Programme WomEng - Creating Cultures of Success for Women Engineers.

In the survey realised in the frame of the project a question dealing with the interest and motivation of engineering students has been tested and compared among the countries.

Some conclusions from the survey in EU countries in comparison to the answers of the Slovak students:

What are the reasons which made you decide to choose engineering?

The Slovak Republic reached opposite results when comparing the other countries involved in the survey – France, Germany, the United Kingdom, Austria, Greece and Finland. Students from the Slovak Republic declared significantly lower general interest in Engineering, Computer Sciences and Technology. As the opposite, they are significantly more interested in Mathematics and Mechanics as the students from other countries participating in the survey.

The answers underwrite the hypothesis, that in the Slovak Republic the study of Engineering is very often only a second choice for the students, not a first interest and at the same time the different image of technology. Moreover, when choosing engineering study, they probably support the decision by a good knowledge of mathematics and interest in mechanics.

There is no significant difference when comparing Slovak males and females.

What are your perceptions of engineering professional life?

Comparing the other countries involved in the project, the perception of engineering professional life is different in the Slovak Republic. They do not consider it as having a heavy workload and a problem with work/life balance, etc.

The Slovak Republic, having different historical background disclosures differs mostly in the motivation for studying engineering and their perceptions of engineering professional life. At the same time, the effect of choosing engineering as the “second choice” has consequences causing those differences.

The movement to interdisciplinarity was a good step to keep up the number of engineering students in the Slovak Republic during the transition period from a centrally planned economy to a market economy. Although keeping the quantity has been accompanied by the loss in quality and partial turn-out from the classical engineering courses. The positive by-effect of that strategy and development concluded in keeping up the same percentage of female students as before the political and economic change. And that led partially to an improvement of the soft skills of engineering students.

8.4 Innovations – an Impetus for Learning or Vice-Versa?

Innovation – new information - the life long learning. It takes on average 8 years for the learnt information is become obsolete. Hence the role of the university is growing, especially in the curricular way of study. University provides the highest grade of education that is based on tenths of years of learning (primary, secondary and university degree). This means university should provide up-to-date knowledge and encourage critical thinking and learning-by-doing as an impetus for innovations.

Learning as such is settled and certain, while innovation is controversial and uncertain. This is where the debate starts about the learning regions labelled so for their innovativeness or the ability to absorb new technology, innovations from elsewhere. The ability to absorb new ideas depends on the human capital that ought to possess characteristics such as: flexibility, open-mindedness, creativity, entrepreneurial spirit etc. These features are combined with technological equipment, facilities and can lead to the economic development of the area across the three steps of technological advance.

Technological advance is a three-step process:

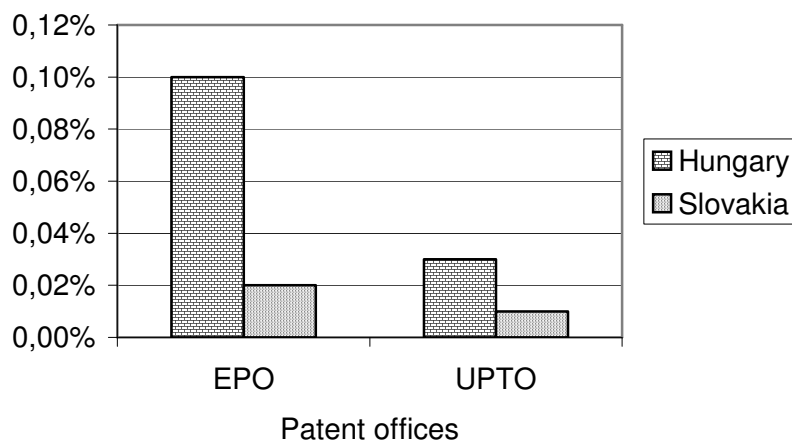
1. step: Invention

“The first discovery of a product or process through the use of imagination, ingenious thinking, and experimentation and the first proof that it will work.” (Brue, McConnel, 1999)

For instance: the well-known invention of the parachute by Štefan Banič (1870-1941), who had lived in USA. It is said that he was Slovak patriot, who had left Austria-Hungry because of loosing his job because of attempting to improve the conditions of co-workers. Nowadays companies would wish for such workers. How is it really?

All market entities consist of unique human beings (former students), who posses creativity (who were taught and trained in creativity) that enables them to invent. Hence "Governments encourage invention by providing the originator with a patent, an exclusive right to sell any new and useful process, machine, or product for a set period of time." (Brue, McConnel, 1999) Firms in the US and Europe secure the most patents. We focus on Hungary and Slovakia, as its regions are the objective of the NORRIS project (North Hungary and Košice Bilateral Regional Innovation Strategy Project). The figure provides data for the number of patents registered by the US Patent Trademark Office (UPTO) and the European Patent Office (EPO). According to Key figures published by the European Commission we introduce to you graph 1 about technological output. The results are not satisfactory for the regions in northern Hungary and eastern Slovakia. The patent applications in the EPO were mainly from Germany, the US and Japan. Hungary had 0,10% and the Slovak portion of technology output was 0,02%. This share is a secondary measurement of the invention capacity in the regions.

Graph 8.2 Patents Share (%) from all the Countries



Source: own elaboration based on: Towards a European Research Area Science, Technology and Innovation - Key Figures 2003-2004. Europe. European Commission. Research. ERA.European Research Area. [online] Published 2003. [31.8.2005]. Available at <http://europa.eu.int/comm/research/era/keyfigures_en.html >.

2. step: Innovation

“It is the first successful commercial introduction of a new product, the first use of a new method, or the creation of a new form of business enterprise.” (Brue, McConnel, 1999) We distinguish between product innovation and process innovation. It is not always a new product based on invention that secures a company's profitability. We can find examples of companies producing or providing the same product or service, one with lower and the other with higher profitability. It can be explained as the innovation of the management process, where the firm achieves higher efficiency thanks to better utilization of the workers skills and previously described characteristics. Thereby, it is necessary to distinguish between various features of the innovation understandings.

The difference is explained in more detail by table 8.4.

Table 8.4 The comparison of the definition of innovation

<i>Object</i>	<i>Feature</i>	<i>Applied by/in</i>		
		<i>EU</i>	<i>OECD</i>	<i>SR*</i>
Technological product or process		X	X	X
Non-technological product or process				X
New implementations in the process		X	X	
Improvements in the process		X	X	

Source: based on Szmytkowski, D. Innovation Definition Comparative assessment Europe. European Commission. Research. ERA.European Research Area. [online] Published 2005. [17.10.2005]. Available at <<http://www.interecho.com/~smith/daniel/os.htm>>.

3. step: Diffusion

“The spread of innovation through imitation or copying” (Brue, McConnel, 1999: 542) is the third and last element of technological advance. Technological capability to advance consists of two sets: the learning ability represented by the absorption capacity of the employees and the ability to generate new technologies, processes, products, services by the means of innovation. From another point of view it is simply a shift from pure monopoly towards oligopoly as claimed by the inverted-U theory. This states that the most convenient market structure for R&D commercialization is oligopoly. Because small firms do

* Based on the National Innovation System in Slovakia and upon the Act on innovations that came into force on January 1st, 2006.

not have enough money to support R&D and monopoly does not have enough motivation, the profit expected from innovations will not add much more.

All three steps could be abbreviated in one term “research and development” (R&D). The innovations are driven and represented by entrepreneurs and intrapreneurs. The latter ones are considered the spirit of entrepreneurship. This is typical for sole traders. Usually the more mature and larger the firm grows the more it loses the entrepreneurial spirit as well as the ability to apply new knowledge. The absorption capacity exists only when there is something to absorb, while the capability to absorb exists and is expanded by learning and application. How much money does the technical advance absorb? Tables 8.5 and 8.6 provide the answer and an overview of R&D expenditures for the countries in question. The regional players, actors mentioned later, try their best to absorb, to internalize the knowledge gained from various sources (learning-by-doing, FDI, licensing, by adapting and imitating etc.).

Table 8.5 Total intramural R&D expenditure (GERD) by sectors of performance and region (Millions of euro (from 1.1.1999))

		<i>Total All sectors</i>	<i>Sector</i>			
			<i>Business enterprise</i>	<i>Government</i>	<i>Higher education</i>	<i>Private non- profit</i>
Hungary	2003	693.057	254.578	217.219	185.206	-
	2004	721.311	296.595	213.145	177.283	-
Slovakia	2003	169.105	93.35	53.46	22.247	0.048
	2004	174.029	85.603	53.071	35.006	0.35

Source: Europe. European Commission. Eurostat home page. General and regional statistics. R&D expenditure and personnel. [online] Published 2006. [26.4.2006]. Available at <http://epp.eurostat.cec.eu.int/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/general/regio/rd/exp_pers&language=en&product=EU_general_statistics&root=EU_general_statistics&scrollto=446>.

Table 8.6 Total intramural R&D expenditure (GERD) by sectors of performance and region (Percentage of GDP)

			<i>Total all sectors</i>	<i>Sector</i>		
				<i>Business enterprise</i>	<i>Government</i>	<i>Higher education Private non- profit</i>
Hungary	2003	0.95	0.35	0.3	0.26	-
	2004	0.89	0.37	0.26	0.22	-
Slovakia	2003	0.58	0.32	0.18	0.08	0.0
	2004	0.53	0.26	0.16	0.11	0.0

Source: Europe. European Commission. Eurostat home page. General and regional statistics. R&D expenditure and personnel. [online] Published 2006. [26.4.2006]. Available at <http://epp.eurostat.cec.eu.int/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/general/regio/rd/exp_pers&language=en&product=EU_general_statistics&root=EU_general_statistics&scrollto=446>.

Thus we already have two arguments to support the idea that “learning and innovation are almost opposites”. The first argument is that learning needs time and investments for preparation of information to be learned from elsewhere then we can call it copying, which is typical for the third step of technological advance. Where it is evident that monopoly of the innovation is being defeated and the structure of the market changes.

The second argument is that innovation requires change, in contrast to learning, where we need to be disciplined and follow the learning objectives, unless it is learning-by-doing. In the process of this special type of learning many good ideas may pop up, which we can match with the first step of technological advance – invention. Later on it is the matter of soft skills, whether the ideas are going to be commercialized or not. Such is the difference between the exploration of knowledge and its exploitation or research and commercialization.

In connection with what is stated in the “Cities and the Regions in the New Learning Economy”, the OECD study, we can also agree on the correlation between R&D expenditures and patent applications intensity.

Where does the first impetus for the invention come from? It is in organizational learning. It is in the interaction of actors on the supply and demand side of R&D. This interaction is possible via human capital that must be also cultivated. The forms of cultivation are various and they depend on the existing regional culture. Some cultures value learning as the highest asset, whilst some cultures do not consider learning worthwhile. So when talking about learning regions we ought to know or anticipate the attitudes towards learning

(as discussed previously) or attitudes towards accepting new ideas. These attitudes can be measured by indicators (secondary e.g. salaries of teachers, their status in society etc.) All that was written is expressing coherence with Lundvall³⁸ opinions.

8.5 *Is Košice Region Learning and Innovative?*

An empirical approach would consider a region being a learning region if most of the following factors are observable:

- A wide range of learning opportunities are available and easily reachable to people of all ages;
- Large and increasing proportion of people take part in both formal and informal learning activities;
- An increasing proportion of inhabitants have jobs in knowledge-based production;
- Universities and schools are a major focus of community life in each area
- Public and private institutions are learning organisations as well;
- Effective learning networks and Information and Communication Technology (ICT) links exist at all levels of learning;
- HEI and other learning bodies provide training opportunities that respond to the needs of employers;

An interesting issue is the gap between the expectations of the employers and universities affiliation to their regions. Employers are looking for graduates who come to them already equipped with soft skills such as teambuilding, negotiation, interpersonal skills, etc. All those soft skills are verified to be somewhat missing as graduates enter the labour market. And it is up to the university staff to offer courses that will enable them to obtain such skills in a greater extent or in a better quality.

The engagement of universities in the Košice region, although generally proclaimed, is at the very beginning. The first step started as a round table of university management and major employers organised during the Career days at the Technical University in Košice.

The missing soft skills of graduates and the brain drain from the region are two crucial points and doubts of the companies located in the region. Some of

³⁸ Professor in Economics, who currently concentrates on innovation theory, national systems of innovations etc.

the companies – Siemens for instance – have started a campaign to get back a well skilled labour force from the Bratislava region and the Czech Republic. There is a gap in the labour market with a still high regional unemployment rate of 24,7% for the Košice region in 2005, is attended by a hunger for computer and software engineers and managers related to recent foreign direct investments in information and communication technologies (Ness Technologies, Siemens, T-Systems, PSE) and the automobile industry (Getrag Ford).

University ought to co-operate with other actors operating and located in the region. The co-operation can be labelled as an institutional change, which, as it is well-known, is a slow and hard process. O. Williamson³⁹ expresses it that it takes 102 years or the saying “it is easier to build a road than to create an efficient organization for its maintenance”.⁴⁰ Much easier is to establish a symbol. This regional symbol (bridge or road, which connects the two regions e.g. East Slovakia and North Hungary) can connect people and give them an identity they can share and augment. This is also one of the substantial tasks for the learning region to learn. The changes at university and regional level are still ahead of the regional learning. That is particularly based on a not well working regional partnership in Košice region.

Learning and innovative regions are those that show resilience to change. At the same time by stable but flexible business sector research and learning institutions is the key to success, going along with the transfer of technology.

When examining a learning and innovative region, it is worth splitting it into layers. At the micro level of a learning region, there is an employee, who is a subject of human capital investment. The mezzo level is an organization or institution that fosters training and the policy of learning-by-doing. The macro level is presented by government national investment into research in universities and research institutes. The regional level can be both national and international investment of either private corporations or public institutions; usually it is complementarities of that capital. An aspect of investment on research and development is illustrated in Table 8.7, where we can see the portion of state expenditure for the Košice region in years 2002-2004. It is about 8-9% every year from approximately the same lump sum for the Slovak Republic. Current expenditures are stable (9%), while the capital expenditures vary (11%, 4%, 5%).

³⁹ Williamson, O. E. (2000) The New Institutional Economics: Taking Stock, Looking Ahead. Journal of Economic Literature Vol. XXXVIII (September 2000), pp. 595-613 university of California. Berkley Haas School of Business. Business and Public Policy. Oliver E. Williamson [online] Publikované 2000. [16.01.2005]. Dostupné z <<http://groups.haas.berkeley.edu/bpp/oew/papers.htm>>.

⁴⁰ One can add that the only who claim to do it was Jesus: „Destroy this temple, and in three days I will rise it up.“ John 2:19 It is meant the temple of the institution, not the building itself. The new institution must have a leader, who is accepted by most of the cooperating partners.

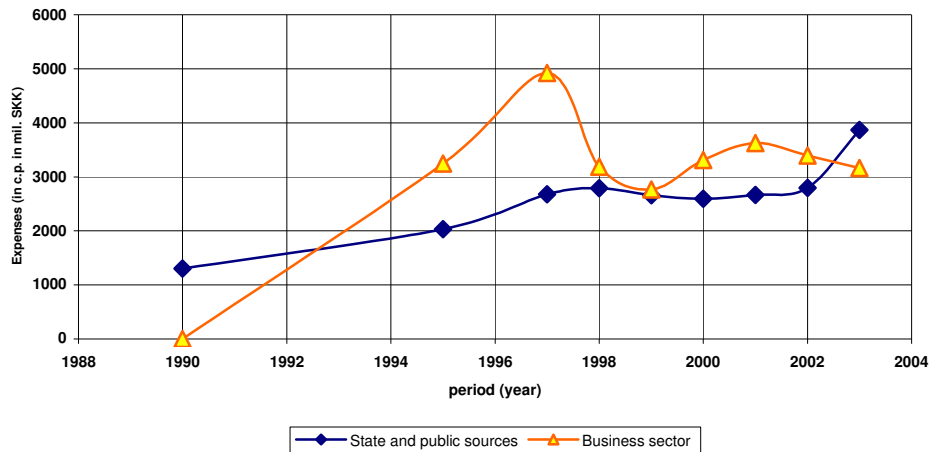
Table 8.7 R&D expenditure in Slovakia and in Košice region

<i>Territory Year</i>	<i>Total gross domestic expenditure on research and development</i>	<i>Capital expenditure in total</i>	<i>Current expenditure in total</i>
<i>The Slovak Republic</i>			
2002	6 332 656	528 052	5 804 604
2003	7 016 275	777 150	6 239 125
2004	6 965 430	742 334	6 223 096
<i>The Košice region</i>			
2002	573 438	61 351	512 087
2003	563 842	31 785	532 057
2004	617 720	38 042	579 678

Source: based on data of KSK, 2006.

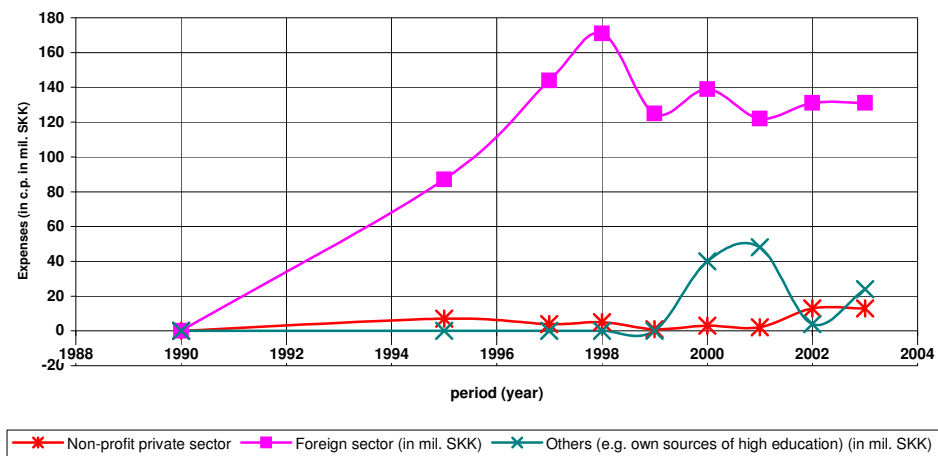
The trend is also illustrated for a longer period for the whole of Slovakia in the graphs below. We focus more on the sources of this expenditure. The business sector has still not reached the level of 1997 (4 921 mil. SKK) as shown in graph 8.2. Graph 8.3 depicts that the non-profit private sector has extended the expenses to R&D, presumably due to projects funded by the EU. Foreign and other resources are additional, but are still a considerable amount.

Graph 8.2: The Expenses on Research - the Substantial Sources



Source: Own elaboration based on data of KSK, 2006.

Graph 8.3: The Expenses on Research - the Additional Sources



Source: Own elaboration based on data of KSK, 2006.

Apart from the money invested in development, the researchers are the most important asset of a learning region. If we omit the brain drain, then they do not migrate substantially. The change in the number of R&D employees is not significant according to data in table 8.8.

Table 8.8 R&D Employees in Slovakia and in Košice region

	<i>Number of R&D organizations</i>	<i>Registered number of R&D employees (persons)</i>			
		<i>Total</i>	<i>Of which:</i>		
			<i>Researchers</i>	<i>Technicians and equivalent staff</i>	<i>Supporting staff</i>
<i>The Slovak Republic</i>					
2002	270	21 025	15 385	3 792	1 848
2003	265	20 928	16 108	3 229	1 591
2004	272	22 217	17 354	3 108	1 755
<i>The Košice region</i>					
2002	24	2 739	2 288	314	137
2003	28	2 776	2 346	277	153
2004	25	2 995	2 562	314	119

Source: KSK, 2006.

Altogether, whether researchers or other employees, we can assume that migration is a matter of attitude towards the region. Certainly we cannot assume that there is something like “attitude of gratitude” from the students i.e. students do not stay in the same region they were born (as an expression of gratitude) to work and help the region to lift up the situation. Exceptionally, sometimes there is an expression of gratitude, when former a born and bred Slovak comes back and tries to start a new business etc. Herewith the situation concerning R&D of Košice region was partly described.

Table 8.9 Institutions in the development of the region

<i>Institutions in formal (the informal are the links between them)</i>		
<i>Political</i>	<i>Economic</i>	<i>Cultural</i>
- administration	- SMEs, large companies	- galleries
- public authority of the cities and villages	- banks	- museums
	- insurance	- libraries
- The office of public procurement	- tax, accountant advisors	- mass-media
	- schools, universities	- information centres
- police	- incubators	- cultural centres
- courts	- research institutes	- churches
- embassies and foreign diplomatic missions, consulate	- Chamber of commerce	- clubs
	- Chamber of industry	
	- professional associations	
- regional development agency (RRA)	- clubs, unions	
- The office for state support	- hospitals and other medical facilities	
	- market	-
	- Business innovation centre (BIC)	
	- Regional information and consultancy centre (RIC)	

Source: Own elaboration.

To answer the question “Is Košice region learning and innovative?” we sum up the conditions in Košice Upper-Tier Territorial Unit, KSK or simply Košice region. The answer comes from table 8.9 that quotes the official, formal institutions for improvement of the situation in the region. The result for the time being is not favourable and it is briefly summed up below.

- Wide range of learning opportunities are available but rarely adapted to the region and employers needs, universities and schools are not a major focus of community life;
- Proportion of people taking part in both formal and informal learning activities is increasing;

- Still the proportion of inhabitants having jobs in knowledge-based production is decreasing; Public and private institutions are learning organisations as well;
- There is almost no interconnection (bridge) between R&D and undertakings;
- There is some R&D infrastructure, but it misses any coordination (leader) of scientific-technical, industrial and regional policy (although there are enough institutions);
- The above-mentioned state or regional subsidies or other funds are difficult to obtain;
- There still is qualified personnel in some areas and the access to manufacturing market exists.

Despite the efforts the task to turn Košice region into a high-tech region is difficult. But that does not mean that we should stop our endeavour. On the contrary we should stop creating new formal institutions and start to interconnect the existing ones. We need to find a way that will allow co-operation in the sense of liberalism (shift from rigid to flexible).

The following Table shows formal institutions, they are separated into three groups (political, economical and cultural). This division can help us to think about the links or conjunctions that already exist and would be ideal to extend them.

The above mentioned capacity to learn can also be derived from the interaction of the actors in the institutions and the more intensive is the interaction, co-operation among players the better is the chance to extend the capacity to learn (learning-by-doing).

Mapping the regional innovation system we have identified the institutions in the development of the Košice region that are provided in table 8.10. This set of entities are evolving their own culture in the process of social learning that can be reinforced by university and the graduates working there. The importance of all items is accentuated e.g. SMEs and large companies influence the wages and thus the labour market, banks influence the payback of investment into research and thus they determine demand for the innovations etc. Reinforcement of the rules underscoring trust and culture for communication

(learning-by-interaction⁴¹) among firms and various agencies or local authorities is one of the possible factors in achieving sustainable motivation and enthusiasm in favour of learning and innovating. It is here where the principles of partnership are to be applied and advantage taken of them.

8.6 Conclusion

The situation in Košice region was described in the last section and stress was given to the educational sector and students as its “product”. The linkage between learning, the labour market, HEI and innovations and the effects upon the region have been studied as well. We have shed light on the “balance of academic trade”, the importance of innovating the system of learning and flexibility in changing the habits of a university as a key player in the regional development in the networks and partnerships. Regarding Košice region, there is still a lack of coordination in the process of creating the climate towards the learning (and innovative) region, thus the climate is not favourable. The coordination of the activities is confronted with a lack of interest of the partnership members and misses the engagement of key players. Nevertheless, the willingness to change it is already present at both the national and regional level.

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⁴¹ „Storper (1996) suggests ... that small, repeated low-cost experiments can generate interactive learning between parties in an environment which has previously been characterized by distrust or antipathy. These same concerns lie at the heart of the regional innovation experiments in Europe. The need for institutional learning, at the local and regional level is critical to the success of such [talk, building trust] efforts.“ (Wolfe, 2002).

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9

How to Calculate the Impact of a University on the Regional Economy. A Case Study of the University of Groningen, the Netherlands

Piet H. Pellenbarg, University of Groningen

9.1 Introduction

Education and research are without doubt the two main tasks of every university. Nonetheless the awareness is growing that apart from being school and laboratory, universities are also enterprises, with a corresponding function in economy and society. Narrowly defined, this pertains to the sale and distribution of knowledge and educational services. Broadly defined, it leads to a vision of the university as partner of government and business, together reaching for regional economic development. (Maskell and Törnqvist 2003). The university even performs a core function if one places this development in the modern concept of the learning region, that is, the idea of a relation between knowledge creation on one hand, and economic development of firms and regions on the other, embedded in regional networks.

Florax provides a striking description of the core task of the university in the regional economic developmental process in his book *University: A Regional Booster*, a title that suggests that the university can play the role of tug, auxiliary engine, dynamo, booster, or whatever name one chooses to give to it.⁴² Many of these sorts of utterances can be found in the nineties of the previous century.⁴³ The globally repeated success stories of Boston (Route 128) and San Francisco (Silicon Valley) where the top universities MIT and Stanford are attributed such a booster role, play a large role in the persuasive powers of the authors who write about it. In Europe, the Cambridge phenomenon is the classic example of a top university that attracts throngs of highly reputable companies and thus provides the region with an enormous impulse.⁴⁴ The

⁴² R. Florax, *University: A Regional Booster* (Aldershot 1992).

⁴³ For example: M. Bleaney, M. Binks, D. Greenaway, G. Reed, D. Whynes, 'What does a university add to its local economy?' *Applied Economics* 24 (1992) 305-311; H.W. Armstrong, 'The local income and employment impact of Lancaster University', *Urban Studies* 30 (1993) 1653-1688; E. van der Meer, *Knowledge on the move: the university as a local source of expertise* (Amsterdam 1996); J. Goddard, *Universities and regional development: an overview*. Background paper of the OECD project on the response of higher education to regional needs (Newcastle upon Tyne 1997).

⁴⁴ D.E. Keeble, 'High technology industry and regional development in Britain: the case of the Cambridge phenomenon', *Environment and Planning C* 7 (1989) 153-172.

success stories become well known and local and regional politicians are predisposed to do something with this: universities are 'sexy' and provide the region prestige. In several countries, the establishment of universities has actually become part of regional policy, such as in Sweden (Lulea, Norlän) and in Norway, Finland, Germany, Ireland and the United Kingdom.⁴⁵ In the Netherlands, the establishment of the Technical University of Twente and the University of Maastricht can essentially be regarded in the same context, that is to say that they have also been intended to be instruments of regional development.

Yet there is also ground for scepticism concerning the willing acceptance of the vital role of universities in regional development. The above-cited Maskell and Tornqvist for example, warn against finding a relationship that is too loose, too easily. The network relationships are extremely complex by nature, and a combination of favourable circumstances in one case, does not always work in another. In the US for instance, it is pointed out that several high-quality universities such as Berkeley, Cal Tech, Columbia, Chicago, Harvard and Johns Hopkins have not played a role as incubator for high-tech industry in the region.⁴⁶ And at the somewhat higher analytical level of the Netherlands in the eighties, it has been shown that regional differences in higher education are not reflected in the level of regional economic development.⁴⁷ A disrupted labour market and migration flows can easily cause a negative surprise for those who take the role of universities as regional boosters for granted.

The previous makes clear that it is dangerous to paint too rosy a picture of what an institution such as the University of Groningen can economically achieve for her region by offering easy descriptions, associations and comparisons. A solid sketch of the regional-economic impact of the RUG - especially if we want to provide this in quantitative terms - in the first place requires the availability of some kind of mathematical model, a model wherein the various dimensions of the economic impact are catalogued and perhaps connected to one and other. First we shall look at several attempts that have been made at this by various economists of the RUG itself in the sixties and eighties of the previous century, that is, well before the hype surrounding learning regions. Because the initial mathematical attempts led to rather limited results, we will examine the possibilities of a broader impact analysis afterwards, first aided with the schemas of Florax and Lambooy, then aided by the spatial function model of Vermeulen, in which we shall attempt to insert known data of the current situation.

⁴⁵ R. Florax, 'De regionaal-economische betekenis van de universiteit', *Geografisch Tijdschrift* XXI-4 (1987) 354-368; P. Maskell and G. Törnqvist, 'Universities and the learning region', in: R. Rutten, F. Boekema & E. Kuijpers (eds.) *Economic Geography of Higher Education* (London 2003) 129-144.

⁴⁶ E.J. Malecki, *Technology and economic development* (Harlow 1997).

⁴⁷ M. Vermeulen, 'Knowledge still travels on foot; an educationalists' perspective on regional development', in: R. Rutten, F. Boekema & E. Kuijpers (eds.) *Economic Geography of Higher Education* (London 2003) 69-86.

9.2 Old calculations of the impact of the RUG according to input models

The ideas concerning the regional and social function of universities have particularly grown since the second half of the 1960s, when due to the combined effects of increased wealth and the baby-boom generation leaving secondary schools, the massification of higher and scientific education began to make itself felt - not only in the Netherlands, by the way, but in many countries. Enrolment increased strongly, and concurrently, new and bigger buildings came into existence, often concentrated in new 'growth locations', making universities much more physically visible as institutions of great importance as bases for population growth and employment in their host cities.

In Groningen, this quickly led to the first attempt to determine the actual importance of the university for the economy of the region, by prof. F.J. de Jong of the faculty of Economics.⁴⁸ He worked with an integral input model, which means that one looks at the direct effects of the university on the regional income and regional employment via inputs, in other words via the expenditures that it makes to obtain means of production (land, real-estate, personnel and capital goods). Moreover, the indirect effects of university employee (and student) spending on regional income and regional employment are taken into account. In the period before 1960, the direct university product, calculated accordingly, embodied merely 0.7% of the net provincial product. In 1967, this share had risen to 2.2% according to de Jong - a clear reflection of the growth in student and employee numbers so typical of this era, but still not impressive. Finally, a result of 2.5% is achieved through indirect effects. According to de Jong, the difference between direct and indirect results is very small due to the high regional import quota (read: much university spending was done outside the province).

De Jongs calculations are open to critique. Especially criticised are the application of relations from input-output tables of 1953 on figures for 1960 and 1967, and the assumption that consumer spending-, savings- and taxation quotas for Groningen are equal to those of the Netherlands as a whole.⁴⁹ Nonetheless, de Jong befalls the honour of being the first to estimate the regional-economic impact of a university in the Netherlands.

In the 1980s the Groningen economists Oosterhaven and Stoffelsma provided another input model calculation of the RUG. This calculation, however, does not account for the expenditures of the university as a whole, but only accounts for student spending and as such, is not directly comparable to the calculations of de Jong. Using interregional input output models (which de Jong did not yet have access to), Oosterhaven and Stoffelsma estimate that the approximately 16,000 students of the RUG generate a net income effect of

⁴⁸ F.J. de Jong, *De economische betekenis van de Rijks Universiteit te Groningen voor de provincie* (Haarlem 1969).

⁴⁹ Florax, 'De regionaal-economische betekenis van de universiteit', 360.

between 74 and 88 million guilders per year, corresponding to 1250 to 1500 full-time jobs, of which 40% in retail (trade), hotels, cafés and restaurants. Half to two-thirds lands in the city itself. The integral employment effect of the RUG, including the university employees and their expenditures in the region, and the mitigating effect of the investment and exploitation expenditures amount to 8500 to 9500 full-time jobs, that is 5% of employment in the province of Groningen, and 2% of employment of the North as a whole⁵⁰. These are certainly not figures to be ignored, figures that seem higher than those of de Jong for 1967, but they still are not figures suggesting a university that substantially drives the regional economy. Perhaps that is due to the method of calculation, however. We shall see that a broader approach than an input model is possible.

9.3 A broader vision on regional-economic impact; attraction effects

In a publication a few years ahead of his earlier cited dissertation of 1992 concerning the university as a regional booster, Florax gave eight aspects of the possible influence of the establishment of a university on the region (table 9.1).

The distinguished effects cannot really be isolated of course, but are related in various ways. This is especially true for the economic effects, which are strongly related to, for example, demographic developments, infrastructure and the image of the region. Florax then makes clear that there are generally three ways to map the economic effects: through inputs (or *backward linkages* of the university), through outputs (these are the *forward linkages* of the university) or through a model that combines input- and output effects with the so-called *attraction-effects*.

The calculations of Oosterhaven and Stoffelsma are clearly of the input model kind, which depends primarily on the expenditures of a university and its students and employees. This kind of model calculations became popular in the 1960s and 1970s, and many have been made.⁵¹ The opposing output method concerns the income and employment effects of graduated students, departing employees, and the effects of regionally relevant knowledge and regional services. Very few examples of this method are known, and it was never used for the RUG. In the third model, which Florax calls the 'encompassing method,' attraction-effects are also taken into account. By this is meant the attraction on visitors and companies (especially high-tech companies), the latter possibly embodied by special research parks or science parks. In this case the influence of the university on the image of the region is specifically at stake. Output and

⁵⁰ J. Oosterhaven, 'De betekenis van de RUG voor de regionale employment opportunities', *Universiteitskrant* 10 maart 1983; J. Oosterhaven en R.J. Stoffelsma, *De economische betekenis van bestedingen van studenten in Noord- en Overig Nederland* (Groningen 1983).

⁵¹ For a survey of the US see also: I.S. Fink, 'The economic relationship between institutions of higher education and their local communities', *Planning for Higher Education* 8 (1980) (4) 41-47.

attraction effects are particularly hard to distinguish in the formation of concentrations of high-value business in the neighbourhood of universities. Companies that evolved as spin-offs from the university, founded by former students or employees, fall under output effects. When attracted from elsewhere, they fall under the attraction effects. From the outside one cannot see which of the two effects it concerns.⁵²

Table 9.1 Classification and examples of regional effects of a university

<i>Regional effect of a university on:</i>	<i>Example</i>
Politics	Change in political structure, increased citizen participation, improved organisation of the political process
Demography	Change in the birthrate and deathrate, greater mobility
Economy	Effect on regional income, the industrial structure, the labour market, labour mobility
Infrastructure	Effect on housing, traffic, medical services, the retail sector
Culture	Greater supply of cultural goods, influence on the cultural climate
Attraction	Influence on the image of the region, the regional identity
Education	Effect on participation, change in quality
Social aspects	Effect on the quality of life, the influence of students

Source: Florax 1987.

It is important to note that in the attraction effect there is no difference between integral and marginal effects. Attraction effects take place or not, related to the presence or absence of a university. With input and output effects, there is a difference between integral and marginal effects. Marginal effects are 'real' effects; to calculate them, from the integral effects one deducts the effects that would have taken place when the available funds would not have been invested in a university or - if it concerns regional effects as is the case here - the university had existed in a different region, in this case outside the Northern Netherlands. The research of Oosterhaven and Stoffelsma takes this into account, for instance. As expected, it shows that by far the greatest part of the

⁵² Florax, 'De regionaal-economische betekenis van de universiteit'.

integral effect for the Northern region is also a marginal effect, and as such would not have happened if the RUG had been located in the Randstad.

9.4 The model of Lambooy; the entrepreneurial university

A proper study according to Florax 'encompassing method' in which apart from income, expenditures and the concurrent direct and indirect employment, also the effect on business in the shape of spin-offs, science parks and such play a role, has never been conducted for the RUG. A contribution to the conference on 'University and Society' in 1996 of the European Centre for Strategic Management (ESMU) concerning the RUG where regional network relations were the main focus, is no more than a start to an examination of such an all-encompassing approach.⁵⁴ In this ESMU paper, the analytical model provided by Lambooy is used, which differs from Florax' model.⁵⁵ The essence of this can be seen in table 9.2. This model is not actually a model in the economic sense, but a summary of categories of effects affecting labour and income, and as such can be called 'economic'. Both input and output effects are included in the list, but attraction effects have been left out—unjustly so! Currently, attention is being paid in a more fashionable way to two other categories of effects, namely 1) the spin-off of 'high tech' and 'high touch' firms from universities and 2) the economic effects in the shape of commercial sale of knowledge in various forms.

In light of the wave of interest in business innovation in the 1980s—regarded as the saviour for the then fumbling economy - the growing interest in the role of universities as commercial knowledge sellers and incubators of high value business is logical. Following the example of American universities, Dutch universities (the TU Twente at the forefront) fully embraced their incubator function, started counting the number of small businesses they generated, and started to establish science parks to house these businesses. There have been a few major studies of the scope of the academic incubator function, commissioned by the Ministry of Economic Affairs by van der Meer and van Tilburg, by the National Planning Service by Vlessert and Bartels, and by the University of Nijmegen by Buck and Roelofs.⁵⁶ Regrettably, there is no such study available for the RUG.

⁵⁴ P.H. Pellenbarg, 'Defining the university region; the case of the University of Groningen', Paper presented to the conference 'University and Society' (Veszprem 1996).

⁵⁵ J.G. Lambooy, 'Knowledge production, organisation and agglomeration economies', AME-Congress paper (Amsterdam 1996).

⁵⁶ J.J. van der Meer en J.J. van Tilburg, 'Spin-offs van de Nederlandse kenniscentra', Economisch-Statistische Berichten 69 (1984) 1170-1173; A.C.J. Vlessert en C.P.A. Bartels, Kenniscentra als elementen van het regionale productiemilieu (Oudemolen 1983); R. Buck en B. Roelofs, Spin-offs van de Katholieke Universiteit Nijmegen; voorverkenning ten behoeve van een science park (Nijmegen 1985).

Table 9.2 Classification and Examples of Economic Effects of Universities

<i>Economic effect of university:</i>	<i>Example</i>
Employment at the university	Number of jobs at the university and related institutions
Income of the university	State contributions, tuition fees, financial a.o. benefits e.g. from book sales & merchandising
University spending	Purchase of goods and services by the university
Income and spending of university employees	Wages, salaries, and social security costs. Expenditures in shops, on entertainment and culture, and on public transportation
Labour market effects	Delivery of educated labour. Heightened productivity effect.
Spin-off of business	Companies founded by (former) students and university employees, whether or not employing academic knowledge and technology
Marketing of knowledge	The sale of knowledge in a variety of forms: from ideas and courses to patents.

Source: Lambooy (1996) (modification).

The modern, business and market-oriented trend of the 1980s befits a modern phrase: the 'entrepreneurial university'. In practice, it is particularly the Technical University Twente that ascribes to this label, after research had shown that especially here, large numbers of knowledge-intensive spin-off companies had been founded: at the end of the 1990s there are more than 300, providing 2000 jobs.⁵⁸ Curiously, no such wide-ranging research of spin-offs of the University of Groningen has ever been done because apart from the TU Twente and Leiden University, the RUG was one of the first to provide for dedicated housing for university spin-offs at the Zernike Science Park (at the northern end of the university complex in Paddepoel since 1983.). A collective business building became available that was expanded several times, but also separate firm housing was and are still available.

In the early nineties, the science park organisation was split up. The real estate development largely came in the hands of the SIG (Industrial and Trade Buildings Groningen). The Zernike Park management continued as a private organisation under the name Zernike Group and expanded far beyond Groningen. The Zernike Group currently also manages the Amsterdam Science Park, The Regional Technology Centre of IJmond and two science parks in Australia. Moreover, it also manages a dozen of start-up funds, aimed at

⁵⁸ J.J. van Tilburg en P. Hogendoorn, Het succes van innovatief ondernemen (1997).

Groningen and various other Dutch cities. Worldwide, the group has already helped 400 companies to start up.⁵⁹

Aside from the Science Park organisation, there are also other signs of increasing involvement with business by the RUG in the course of the 1980s and 1990s, through a number of initiatives:

- the financing of investment initiatives by the RUG through its ‘Temporary Entrepreneurial Placements’ (a subsidy on wages for start-ups);
- the Zernike Seed Fund, which provides venture capital to young knowledge-intensive businesses (RUG together with NOM, ABN-AMRO and Aegon);
- profit centres started up, aided by ISP subsidies, and other market-oriented groups, for instance in the area of biotechnology;
- the establishment of the market-oriented Research and Consultancy Centres (RCC’s) within the faculties (there were already eight in 1999);
- the establishment of a RUG Holding Company under whose structure the Ltd.’s spawned by the RUG (the former RCC’s and spin-offs) function.

There are also important new developments in the area of ‘marketing of knowledge’ (the last part of Lambooy’s model). The ‘Academic Education Groningen Foundation’ (AOG) is founded at the end of the 1980s as the RUG’s organisation for commercial postdoctoral education and quickly becomes market leader of this kind of education in the Netherlands. More about that will follow in the next paragraph.

9.5 The spatial model of educational functions according to Vermeulen

In his doctoral dissertation *Human capital in the hinterland*, Vermeulen presents a model that describes the social meaning of education c.q. educational institutions, specified by type of education and type of effect⁶⁰. It is a very complete model, because it describes both the input, output and attraction effects. Moreover, it specifies the spatial scale on which the effects take place. Particularly the latter makes it very suitable to our goal, and that is why Vermeulen’s model is chosen here to function as vehicle for presenting the

⁵⁹ J. Dijkema, *Ontwikkelingen in het denken over Science Parks* (Groningen 2003).

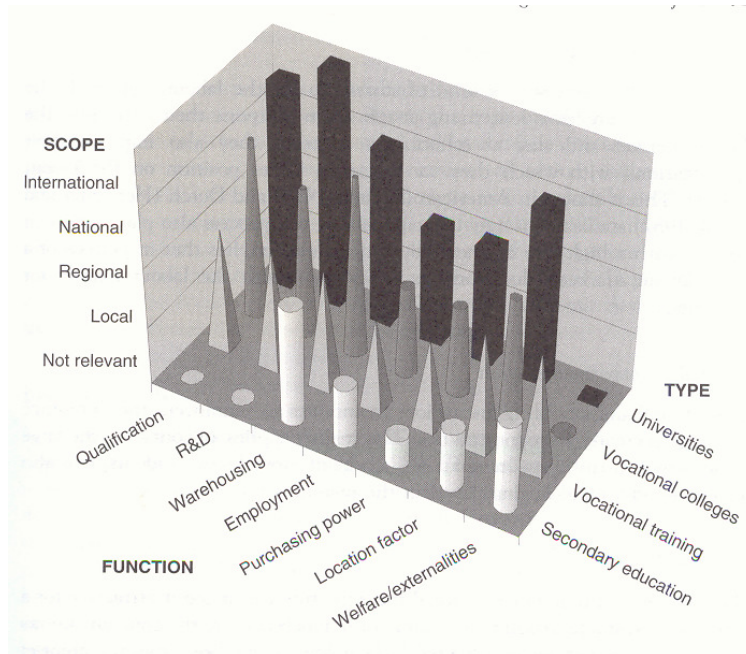
⁶⁰ M. Vermeulen, *Human capital in the hinterland* (Tilburg 1996).

most recent data - insofar as it is known - concerning the regional-economic effects of the RUG. The model is depicted in graph 9.1. First we shall briefly discuss it, after which we shall see what data is available to insert.

For the economy of a city, country or region, the qualification that a degree provides to employees is a very important effect of education in the first place. The effect is greater the higher the level of education is. The same goes for (business) activity in the area of research and development (R&D). The great importance of qualification and R&D effects (both are output effects!) is evident from the high columns in graph 9.1. Both types of effects rise, particularly with universities, far above the regional level, and in fact are at play on a global (international) level. After all, the students and the university derived R&D activities spread across the entire country and sometimes much further. For the region, this effect can also be regarded in negative terms, for know-how disappears elsewhere (brain drain). Remarkably, the qualification and R&D effects for HBO institutions (vocational training and colleges) do remain largely in the region. Warehouse effects are a variation of qualification effects. Vermeulen says that education performs a kind of 'storage function' with regards to the job market. If there are few job opportunities, young adults postpone their entrance to the job market and continue their education. Their qualifications thereby increase. This effect is particularly observable in areas of high unemployment.⁶¹ The model makes clear that this is really the only type of education effect that is of importance at all educational levels, be it that is most applicable to higher education. The employment and purchasing power effects of educational institutions in the model are self-evident: these are the direct and indirect economical effects of the money that is spent through universities, their employees, and their students, effects that were central to the aforementioned input models. These are exemplary of regional effects. The location effects from the model are what we would call attraction effects earlier. They denominate the attraction of the university as knowledge centre on high-value business. The spatial consequences of this clearly reach beyond the region. Finally, the model contains a welfare/externalities factor that could also be categorised under attraction effects. This concerns the positive influence that education/knowledge institutions have on the social and cultural life, healthcare etc., which in turn makes a location or region more attractive to study, live, work, or establish a business. Vermeulen calls the spatial level of these effects irrelevant, but that seems to be a mistake: as an attraction factor, they work locally and regionally, for all educational levels, and most particularly for higher education.

⁶¹ Vermeulen, Human capital in the hinterland, 72.

Graph 9.1 A Model of economic functions of institutes of higher education and their spatial scope



Source: M. Vermeulen, Human capital in the hinterland (Tilburg 1996).

9.6 Qualification and R&D effects

An attempt at quantifying the qualification effects of the university towards the labour market naturally starts with student data: the intake, total number of students, and the graduates. The yearly intake of the RUG currently holds steady at about 4000, the total number of students is around 20,000, and the annual output of graduates is about 2500 (the exact numbers in 2002 were respectively 3960, 20,120 and 2458⁶²). To ascertain the regional-economic effect of the stream of graduates that the RUG sends to the labour market, a number of important questions must be answered:

1. How many graduates find employment in the Northern region?
2. How does the regional spread of attained jobs compare to the regional origins of the students?
3. How much of the graduates' income is determined by their education?

⁶² Zie RUG, Jaarverslag 2002 Rijksuniversiteit Groningen (Groningen 2003).

Table 9.3 Regional origins of students and employment region of graduates (% of total)

<i>Region</i>	<i>Origin of students</i>	<i>Employment region of graduates</i>
North	60	35
East	25	15
West	11	42
South	3	5
Other	2	3

Source: LAC 2003, CSA 200463

Table 9.3 shows the answers to questions 1 and 2. Not surprisingly, there is a vast difference between the regional origin of students and the location of their jobs after graduation. A large majority of students originates from the three northern provinces, yet only a third finds a job there after graduation. If we take a wider look and include the entire North-eastern half of the Netherlands, which is after all, the recruitment region where the RUG is dominant (that is to say that this is the region where no other university recruits more students⁶⁵) the image becomes even clearer: 85% of all students originate from that dominant recruitment area, but only 50% remains there to work. Almost the entire difference of 35% ends up in the West, where few students come from (11%) but 42% of the graduate jobs are found. Here we can observe the occurrence generally termed brain drain, but that probably is an unnecessarily negative term. In his inaugural speech on 'labour market and region', Professor of regional labour market analysis Van Dijk preferred the more positive term 'knowledge export' and argued for the growth of this export stream that is so profitable to the RUG, most preferably on the basis of an increased import stream of western students. He also pointed out the existence of a opposite stream of higher educated people from the West to high quality vacancies in the North, which more or less neutralises the drain of graduates.⁶⁶

To measure the economic effect of the RUG students on the region, we cannot only look at the number of them who after finishing their studies enter the northern labour market (35% of 2500 = 875) but we must also know the answer to question 3: how much more are RUG alumni earning and how much more are they spending in the region compared to what they would have done

⁶³ Loopbaan Advies Centrum, Resultaten Alumni-Monitor (Groningen 2003); Centrale Studenten Administratie, Provincie van herkomst RUG studenten (Groningen 2004).

⁶⁵ P.H. Pellenbarg, 'Groningen, regional capital of the Northern Netherlands, seeking a new identity', in: P. Kooij & P.H. Pellenbarg (eds.) Regional Capitals. Past, present, prospects (Assen 1994), 70.

⁶⁶ J. van Dijk, Arbeidsmarkt en regio (Groningen 2001).

without university education? Of course this is not exactly known, but a reasonable estimate seems to be that they will reach a salary level of twice the national income average ('modal income' = 50 to 60,000 euros) instead of merely the average level (29,500 euros). The difference of $875 \times 25,000 = 22$ million euros can be regarded as the 'annual education contribution' in monetary terms of the RUG to the North of the Netherlands. However great a difference this may be for the alumni, for the Northern Netherlands economy it is only a modest impulse. We have to realise that those 875 RUG alumni represent merely 2.5% of the cohort of 35,000 school leavers that annually enters the Northern labour market.⁶⁷ Even more doubt is cast on to the importance of the relationship between higher education and regional-economic growth by the recent research project by the Americans Bils and Klenow, who suggest that it seems that economic growth is more likely to influence the level of education than the other way around! In the introduction we already cited Vermeulen, who draws similar conclusions for the Netherlands.⁶⁸

One must not lose sight of the fact that apart from the mass of students in the age group of 18-28, the RUG increasingly caters to other groups in her academics. There is a steady increase of post-doctoral and senior education. Within this, the commercial contract education provided by the AOG organisation plays a special role. AOG stands for 'Academic Education Groningen'. This is an organisation founded by the RUG and cooperating with the Freia Science Services Company, which provides postgraduate education on a commercial basis under various commercial labels. Since the late eighties the AOG has produced 4500 alumni and the course offerings (particularly in the fields of management and marketing) are growing. Nationally, the AOG has become leader of this segment of the educational market with a turnover of approximately 10 million euros. Just recently it took over the Institute for Business Education (IBO) in Zeist, making the total number of employees reach about a hundred - that is already more than the three small faculties of the RUG have each. The regional-economic effect of the education that AOG provides is small because a national demand is met from centrally locations, but because part of every course is offered in the city, the Groninger character is still emphasised.

The R&D effects of the RUG on the region take us from the educational to the research aspect of the university, and with that also to other faculties: from the education intensive alpha and gamma faculties, to research-intensive beta and medical faculties. Contract-based research is concentrated here, and beforehand, is much bigger in size than contract-based education. In the middle of the nineties, 500 full-time jobs were based on the 'third money stream' (that is all the money that does not come directly from the Ministry of Education or the national research funding organisation NWO) of which 400 jobs were to be found in beta and medical faculties. These numbers have currently become

⁶⁷ L. Broersma, D. Stelder, J. Van Dijk, *Noordelijke Arbeidsmarkt Verkenning 2004* (Groningen 2003).

⁶⁸ M. Bils & P.J. Klenow, 'Does schooling cause growth?' *American Economic Review* 90 (2000) (5), 1160-1183; Vermeulen, 'Knowledge still travels on foot', 73.

much higher. In the course of the nineties the income of the RUG from the third money stream has rapidly grown from less than 20 million euros to more than 40 million euros.⁶⁹

To be clear: almost 90% of the third money stream goes towards contract-based research, and only 10% to contract-based education. In 2002 the turnover of contract-based research already amounted to more than 70 million euros, which is 15% of the total university budget of 470 million euros (RUG 2003). Compared to the numbers from the mid-nineties, an estimated 1000 full-time research jobs must be based on this. Coincidentally, the annual report of the RUG puts this figure at a much lower number.⁷⁰ Nonetheless, a substantial part of the direct employment effect of the RUG to be discussed hereafter is directly linked to her R&D efforts on the behalf of third parties. But the actual R&D effect must of course occur within those third parties themselves - of which only a minority turn out to be from the region, by the way. At the end of the nineties, 40% of the third money stream came from government, 30% came from charitable institutions, and only 10% directly from companies commissioning research to the RUG,⁷¹ of whom we may assume that they are not very often located in the Northern region. Thus, the R&D effect is not exactly massively beneficial to business in the region, which is a confirmation of the assumption in the model of Vermeulen (see graph 9.1).

The third effect on the function-axis of Vermeulen's model is the 'warehouse effect'. This is really a variation on the qualification effect because it also applies to the education of the working population. The term 'warehouse' denotes the situation wherein adolescents choose schooling over the search for a job, if and when there are few jobs. Vermeulen says that this also occurs in the Netherlands, particularly in areas of high unemployment, and in this regard refers to a study by Herweijer and Blank.⁷² Current data that can confirm this for Groningen (or even the entire North) is not available. What is clear, is that 'warehousing' occurs on the labour market in another fashion, namely in the sense that graduates who are looking for their first job do not immediately leave the city of Groningen. This is a classic explanation for the relatively high unemployment in the city of Groningen - all the academically educated young people of the whole of the Northern Netherlands congregate here to experience their first bout of frictional unemployment! The resulting large labour reserve does attract a certain type of business, exemplified by the concentration of so-called call centres in Groningen in the nineties -not specifically academic, but certainly intelligent and linguistically demanding work.

⁶⁹ H. Perton, 'Contractonderwijs en -onderzoek aan de RUG', *Universiteitskrant* 28-1-1999, p. 9.

⁷⁰ RUG, Jaarverslag 2002.

⁷¹ H. Perton, 'Contractonderwijs en -onderzoek aan de RUG', 9.

⁷² L. Herweijer en J. Blank, 'Onderwijsexpansie en werkloosheid', *Tijdschrift voor Arbeidsvraagstukken* 3/3 (1987) 80-86.

9.7 *Employment effects*

The direct employment effect of the RUG comprises in the first instance of the 4400 full-time positions it offers, divided over a total of 5360 employees.⁷³ Many believe that the RUG and her five thousand employees is the largest employer in the Northern Netherlands, and the university likes to boast this herself, but it is no longer true: the Academic Hospital (AZG) is bigger. The AZG's own numbers are not always clear (ranging from 6,5 to 8 thousand) but her official 2002 annual report cites 7000 employees, of which 424 medical specialists, 357 doctor's assistants, 1901 nurses, and 275 volunteers. The remainder is administrative personnel. Together, the RUG and AZG are good for 12.5 thousand jobs, accounting for roughly 10% of the approximately 125.000 jobs in the city of Groningen!

The combined count of the RUG and AZG is debatable, for even without the presence of a university, Groningen may have had another medium-sized hospital in addition to the Martini Hospital. Or would it not? A comparison to other medium-sized cities is easily made, though difficult because the recent mergers of hospitals have altered the historical situation. Whatever the case, at this point in time, of all provincial capitals outside the Randstad only Groningen has two general hospitals, the rest only have one! Furthermore, the Academic Hospital in Groningen is also much larger than the average general hospital. With its 7000 employees, it far exceeds the Martini Hospital (2700 employees) and the other hospitals in the North (Scheper Hospital Emmen 1550; Wilhelmina Hospital Assen 1175; Nij Smellinghe Hospital Drachten 1130; Diaconessenhuis Meppel 1100; and 6 smaller below 1000⁷⁴). The number of beds also denotes a more than average function. In the eight provincial capitals outside the Randstad the number of hospital beds varies from approximately 350 (in Assen) to approximately 1100 (in Leeuwarden, Zwolle and 's Hertogenbosch). The Martini Hospital has 950 beds, which taken together with the 1060 of the AZG, gives Groningen a combined 2000 beds, almost double that of Leeuwarden, Zwolle and 's Hertogenbosch, and three times as many as in Arnhem (650) and Maastricht (690). This 'comparison of beds' makes clear that the AZG is something 'extra' in Groningen. It provides a higher level of medical service to an area that stretches much further than its own provincial borders, and indeed to a large part of the Northern and Eastern Netherlands. Concluding, the assertion seems justified that the presence of the AZG can be largely attributed to its academic status. The personnel of the AZG will therefore be counted as part of the employment effect of the presence of the university. The recently announced merge of the AZG with the medical faculty of the RUG into an academic medical centre (UMC) only further warrants regarding the AZG and RUG as a whole.

A direct employment effect of the RUG takes place, of course, via her spending on businesses in the region. These expenditures can be found in the

⁷³ RUG, Jaarverslag 2002.

⁷⁴ J. Schaafsma, 'Ziekenhuizen doorgelicht', Dagblad van het Noorden 12-9-2003.

section 'miscellaneous expenses' of the operational account of the RUG, which in 2002 amounted to 95 million euros. That is a considerable amount compared to for instance the 76 million the national government spends annually on her regional economic stimulus package for the whole of the North.⁷⁵ But unlike the regional funding of the Ministry of Economic Affairs, not all RUG spending finds its way to regional businesses. Local businesses do dominate the catering expenses of the RUG, the expenses for office furnishings, pc's and such. But the massive expenditures on cleaning, construction, and energy are made with a small number of very large companies who usually are established locally, but have their main offices elsewhere in the country, and that's where the payments are going. To what degree that money then re-circulates back to the local offices of the cleaning, building and energy companies cannot be traced. A careful estimate would be that roughly half of the 95 million spent on miscellaneous expenses eventually benefits northern businesses (and particularly in Groningen), but a precise estimate of the amount of jobs this entails is a bridge too far. It must number in the hundreds in any case.

In much the same way as for the RUG - and similarly debatable - the indirect employment opportunity effects of the AZG via expenses in the region can be ascertained for the region. These will definitely be higher, for on a total balance that is only a little higher than that of the RUG (500 million euros v. 470 million for the RUG) the AZG does spend more on 'miscellaneous expenses', namely 147 million euros.⁷⁶ The part of this amount that can be ascribed to the RUG is the largest part, and would, just as was the case with the personnel of the AZG, form the basis of at least 'some hundreds' of jobs in the region. If one were to add up the spending effects of both the RUG and the AZG, the effect of 1000 jobs in the region and city does not seem exaggerated.

After analysing the direct employment opportunity effects of the RUG (and AZG) that come into existence through personnel and spending, it seems logical to take a look at the indirect employment effects that present themselves in the shape of businesses in the region for which the university has played a critical role in determining the location choice, or those that can pass as RUG spin-offs. We will not, however, tackle these here, because they are not, after all, input effects. Academic spin-off is in actuality really a kind of output effect, and businesses that come from elsewhere are an attraction effect. We will review both cases below, when we deal with the current role of the university as factor in determining location.

A last employment effect of the RUG that cannot be ignored is the role the students have on the labour market. In the course of the nineties, an increasing number of students - currently at least 70% - have started to provide for themselves through small part-time jobs. On average, students work 11.5 hours a week. That is just below the threshold of 12 hours that the Central Bureau of Statistics and other research institutions use in their registration and calculations

⁷⁵ Ministry of Economic Affairs, Nota Ruimtelijke Economisch Beleid (Den Haag 1999).

⁷⁶ AZG, Jaarverslag 2002 (Groningen 2003).

of the labour market. As such, and unjustly, it usually remains unnoticed. A recent study by the Centre for Labour and Policy (CAB) in Groningen concluded that 27,000 out of 35,000 (RUG and Hanzehogeschool) students in Groningen have such a part-time job.⁷⁷ Based on the ratio between the RUG and the Hanzehogeschool, it would mean that 15,000 of these small jobs belong to RUG students. In terms of to their full-time equivalents, that would amount to 4 to 4,500 full-time jobs. Two-thirds of these small RUG jobs are situated in the province of Groningen and more than half (53%, or 8,000 jobs) in the city of Groningen itself. This means that in addition to the 10% of the RUG and the AZG, another 6,5 % of all jobs (large and small) in the city are in some way connected to the university!

One still could not call those 6.5% of all city jobs a true employment effect. After all, they do not concern real input effects such as the direct employment and spending of the RUG that are the result of her own financial means. One could even deem the small jobs student have as a negative, since they occupy a part of the labour market that would have otherwise gone to non-students of the city and province. This is debatable, and the debate was indeed instigated by the CAB report. Given the fact that the unemployed that were 'pushed from the labour market' by the students in most cases receive a welfare allowance that students cannot expect when they give up their (small) jobs, the presence of students on the Groninger labour market can actually be regarded as regional-economically beneficial. We do not include this in the calculation of effects, though.

9.8 Purchasing power effects

The term purchasing power summons a strong association with purchases in shops and is therefore actually too narrow to properly denote what we are concerned with here, namely all indirect effects for the regional economy that occur via the spending of students of the RUG, employees of the RUG and AZG, and employees of suppliers to the RUG and AZG. Among these can indeed be counted the purchases in shops, cafes and restaurants, but also spending on housing, sports, cultural events and institutions, spending on relaxation and a possible holiday in the region, basically all 'non basic' (service) activities that are generated by the 'basic' activity of the RUG and AZG. By service is also meant the provision of public services: government, public safety, education and health services, infrastructure and public transportation, all of which must be, after all, financed from taxes that the inhabitants of the region pay from their income, be it that this largely happens through intervention and redistribution of the national treasury.

Some of the service c.q. purchasing power effects appeal more strongly to the imagination than others. Is it not interesting to know that students are

⁷⁷ O. Bulthuis en E.Klok, De effecten van werkende studenten op de Groningse arbeidsmarkt (Groningen 2004).

responsible for a third of the annual 100 million turnover of the cafes-restaurants-hotel branch in the city of Groningen? The incredibly high density of cafes in the inner city compared to other cities is not for nothing!⁷⁸ But aside from that, students also count in retail spending, as spenders on sport and cultural activities etcetera, and in determining the population number on which to base government budgets for public services. The question is whether or not we should count them partially or completely when determining the size of the service sector. In their input model in 1983, Oosterhaven and Stoffelsma calculated the indirect employment effect of the (then) 16,000 RUG students as 13 to 1600 full-time jobs, i.e. the 'multiplier' here is maximum 10% of the total student number. This will have to be a higher estimate now, but the question is, how much higher. The income position of students has improved over the past 20 years, particularly because aside from parental support and government funding they now work more (in jobs) themselves, and so they spend much more. Their reliance on public services has also increased, particularly due to their massive use of public transport, fruit of the OV card. But the general standard of living has also risen; so more student expenses are needed to 'carry' an enabling job. Furthermore, a larger part of student spending is nowadays probably done outside the region. We therefore assume a modest increase in the employment multiplier for students, from 10 to 15%.

For service activities based on spending by the employees of the RUG and her suppliers, Oosterhaven and Stoffelsma estimate a much higher employment multiplier than for students: 54%. Is that number still usable or should we use a higher estimate now? The literature does not provide much information on the present basic/non-basic ration. Empirical research in this area is difficult and time-consuming, and is not often repeated. In his dissertation, Van Dijk⁷⁹ mentions employment multipliers for all separate economic sectors. These vary with high value services (banking and insurance, business services, medical services and cultural services) from 20 to 50%. A different example: in the eighties Van Dijk and Oosterhaven calculated that the spending of families that moved to the North of the Netherlands amounted to an employment effect of 0.43 full-time jobs per household with a working head of the family.⁸⁰ In recent studies of the possible regional-economic effects of a high-speed rail service to the North of the Netherlands, those last comparative numbers are still being referred to.⁸¹ This is a lower number than the 54% of Oosterhaven and Stoffelsma, but that can be defended because the labour migration to the north of the Netherlands pertains to all sectors, including lower educated employment opportunities who, with lower income also have a smaller service effect. The service employment effect of the university would probably rather be lower than

⁷⁸ F. Tuinman, 'Groningen niet voor te stellen zonder studenten', Dagblad van het Noorden 16-8-2003.

⁷⁹ J. van Dijk, *Migratie en arbeidsmarkt* (Assen 1986).

⁸⁰ J van Dijk & J. Oosterhaven, 'Regional impacts of migrants' expenditures', in: P.W.J. Batey & M. Madden (eds.) *Integrated analysis of regional systems* (London 1986).

⁸¹ Centraal Plan Bureau, *Ruimtelijk-economisch effect van de Zuiderzeelijn* (Den Haag 1999); J.P. Elhorst, T. Knaap, J. Oosterhaven, W.E. Romp, T.M. Stelder, E. Gerritsen, *Ruimtelijk economische effecten van zes Zuiderzeelijn varianten*, REG-publicatie 22 (Groningen 2000).

the 54% of 20 years ago because increasingly, money is spent on foreign travel, and therefore does not stay in the region.

When taking it all in, it seems justified to assume a current purchasing power c.q. service effect of 50% for the employees of the RUG and AZG (respectively their employees and suppliers) and 15% for the students. That gives us the sum of 50% of $(5400+7000+1000=13.400)$ and 15% of 20.000, which is $6.700+3.000 = 9.700$ jobs in the service sector.

9.9 The university as location factor

Firms in the region that are 'linked to' the university other than through the purchasing power effect can be separated in two large groups. On the one hand there are the firms that have established themselves in, or moved to Groningen and surrounding areas because of the presence of the university. On the other hand there are firms that have sprung from the university itself: spin-offs. Spin-offs are not strictly part of the attraction effects of the university. They are actually output effects. But it is the most logical to regard all firms linked to the RUG as centre of knowledge as one. Therefore we will treat them and all other firms that have to do with the presence of the university as centre of knowledge together. Alternately, we could say these are the firms for which the RUG is not responsible as client, but as location factor.

How important is the spin-off of firms by the RUG in the region? The University of Twente (UT) is still regarded as the most 'entrepreneurial' university in the Netherlands. Every year, former students and UT employees found approximately twenty new companies. In total, there are currently already more than 300 such spin-off companies in the UT region. The UT even received a prize for this from the Ministry of Economic Affairs.⁸² The RUG cannot compete with those numbers. An undocumented estimate by the office of the university speaks of 150 companies in the region that can be regarded as spin-offs of the RUG. But they are not easy to find. A partial list can be attained through the Transfer and Liaison Group of the RUG (TLG), which since the nineties has functioned as the centre of expertise for marketing RUG knowledge. The TLG manages a great number of activities, not all of which can be discussed here.⁸³ For the employment effects towards firms, two cooperative relationships are, however, of great importance, namely the relationship with the technology Centre Northern Netherlands (TCN) and with the RUG Holding Company (RHM).

The TCN is an initiative wherein the RUG participates together with all the HBO institutions (professional colleges) of the North of the Netherlands, and TNO, with the goal of supporting innovation projects for middle and small sized business in the North of the country. An evaluation of the TCN programme

82 H. Oomen, 'Kletsland of Kennisland', Binnenlands Bestuur 18-7-2003, 35-37.

83 Transfer en Liaison Groep, Jaarverslag 2002 (Groningen 2003).

reads that over the course of 1998-2001 350 new jobs have been created (and 1500 consolidated⁸⁴). That number will since have risen to about 400-450.

The RUG Holding Company has been active since the late nineteen nineties. She was founded as vehicle for financial participation in enterprises started up by RUG employees, and where the concept of production or service is based on knowledge of the RUG. A Research and Consultancy Centre (RCC) is often a preliminary stage of this kind of entrepreneurial initiatives. The RUG is the sole stockholder in the holding company, which she uses to expressly aim for developing a network of firms around the university and growth of the local economy. At the end of 2003, about 20 companies together with 150 employees were part of the RHM; further growth is forecast in the course of 2004 (for a summary, see table 9.4).

But the activities of the TCN and the RHM do not mark the limit of the spin-off activities of the RUG. There are many more larger and smaller companies that have been set up by the RUG or its employees outside this network, but the Transfer and Liaison Group have not systematically registered them. Notable are, for instance, Pharma Bio Research (research on the working of medicine) with 450 jobs in Zuidlaren, Assen and Groningen, Ophtec (optical implants and corrective eye surgery; 135 jobs), Syncom (chemical productions; 75), BioMade (nanotechnology; 45) and IQ Company (biotechnology; 25). Separate research would be needed to complete this list, something that has not yet been done before.

As opposed to the firms the university “spins off”, there are the firms the university attracts, by being a decisive location factor for companies that (re-) establish themselves in Groningen and the surrounding area. We could call these spin-ons. There is at least one example of a very large company that has come to Groningen due to the RUG (c.q. the medical faculty and the AZG). That company is Cordis in Roden. With its 1500 jobs, Cordis is one of the largest (if not the largest) foreign employers in the whole of the North of the Netherlands. The company is also one of the most important ‘innovation machines’ in the region; it ranks third in patent requests in the North. The RUG itself ranks fifth in that ranking by the way!⁸⁵

Cordis is part of the foreign company Johnson and Johnson; it develops, manufactures and distributes medical equipment, especially catheters and stents. There should be more companies like Cordis for whom the RUG is location factor no. 1, but the story soon becomes monotonous: systematical research into this has never been done. It is, however, doubtful that they are many. There aren’t that many companies that move from other provinces to Groningen (the biggest stream of moves actually heads in the opposite

⁸⁴ AVACON, De economische effecten van de projecten van het Technologie Centrum Noord-Nederland 1998-2001 (Groningen 2001).

⁸⁵ F.J. Sijtsma, J. Spits, E. Bos, A. Ekkelkamp, K. Tan, Uitgevonden in het Noorden (Groningen 2004).

direction⁸⁶ and usually other location factors will be more crucial, such as the labour market, client networks, available real estate or location subsidies).

An example of a labour market-oriented business establishment for which the RUG is indirectly important as a location factor, (because students and recent graduates are the part of the working population that these companies specifically aim for) is the call centres. In recent years, a significant concentration of these call centres has formed in Groningen. BSC, SNT and Transcom are well-known examples of these Groninger call centres. According to the Northern Development Agency (NOM) the province of Groningen currently has 40 of those companies with a combined total of 3500 employees, of which the vast majority (that is, 36 companies and 3300 employees) are in the city. Rated according to the relation between RUG and HHS students, we can ascribe 2000 of those call centre jobs to the RUG.

⁸⁶ P.H. Pellenbarg & N.J. Kemper, Industrial mobility in the Netherlands; patterns, causes and impacts for spatial policy. SOM Research report 99D34 (Groningen 1999).

Table 9.4 Participation in companies by the RUGHolding Company BV

	<i>Participation in:</i>	<i>Interest.</i> %	<i>turnover</i>	<i>fte</i>	<i>Main activity</i>
2003					
1.	ARC BV	60	1,800,000	30	Archaeology
2.	ARGO BV	35	500,000	5	Healthcare
3.	BRCC Milieugroep BV	15	1.000,000	13	Water and air purification
4.	Decide BV	20	200,000	2	Strategic choices R&C
5	Genoclipp BV	7	0	3	Pharmaceutical research
6.	Geschiedeniswinkel BV	40	300,000	5	History R&C
7.	Sound Intelligence BV	7	200,000	7	Signal recognition
8.	IMEnz bioengineering BV	35	400,000	4	Micro organisms
9.	Intravasc BV	29	0	4	Heart valve technology
10.	KNN Milieu BV	35	400,000	6	Environment and economy
11.	Medusa Explorations BV	40	300,000	2	Marine cartography
12.	Merska BV	25	0	0	Pharmaceutical kits
13.	Polyganics BV	17	250,000	10	Biodegradable devices
14.	Pro facto BV	30	600,000	5	Legal and public admin. R&C
15.	PSCG BV	65	900,000	4	Polymer chemistry
16.	Kiadis BV	2	2,000,000	20	katalyst research
17.	The Soil Company BV	13	200,000	3	Agricultural cartography
18.	UC Promotion BV	33,3	500,000	7	Motion sciences
19.	Q-Modus BV	20	250,000	4	Development in communication
20.	Science PLUS Groupe BV	20	300,000	5	IT specials, science softw.
21.	Biovec BV	5	500,000	0	Gentherapy

Table 9.4 (*cont'd*)

	<i>Participation in:</i>	<i>Interest.</i> %	<i>turnover</i>	<i>fte</i>	<i>Main activity</i>
2004					
22.	Virosome Biologicals	9	1,000,000	4	Pharmaceutical research
23.	Angtec BV	10	400,000	4	Pharmacology
24.	Innocore BV	15	100,000	3	Delivery of polymers
25.	Enzis BV	30	100,000	2	Enzyme technology
26.	Go North BV	20	400,000	2	telecom/internet
27.	Gamma weg BV	45	500,000	2	Optimalisation of tarmac spread and distribution
Total business			13,100,000	166	

Source: TLG/RUG.

On the Zernike Science Park, a combination of RUG spin-ons and spin-offs can be found. Since its inception, some 20 years ago, 40-odd companies have established themselves with a total of 1045 employees. This is a much smaller number than that of the Business & Science Park in Enschede (200 companies) yet as large as that of the successful Science Park of Leiden, and with that the Groninger Science Park can boast a spot in the top 3 of the Netherlands. An extra attraction factor of the Zernike Science Park is the international glass fibre network hub that has come into being with the arrival of the data hotel Tyco in 2001 (since taken over by SIG) whereby the conditions have been created to develop a strong cluster of ICT activity at this location. The Groninger Internet exchange - future gatekeeper of the data traffic in the city - is already established here.

From the review of all the companies related to the RUG it becomes clear that there is a certain concentration of one particular sector, the so-called life sciences. That sector has, unsurprisingly, become the vanguard of the development policy of the city and region, embodied by the so-called BioMed City Project. The RUG, the city of Groningen, the Northern Development Agency and a few other larger companies in the sector participate in this project. The NOM, which took care of the management of BioMed City, has recently left from the project,⁸⁷ but nonetheless provides the information that in the entire Northern Netherlands, about 4000 jobs are part of the life sciences sector. This concerns 200 companies, of which 82 in the city of Groningen. A

⁸⁷ B. Nielsen, 'Biotechnologie in Noorden loopt averij op', Dagblad van het Noorden 17-1-2004.

number of these companies, and a significant amount of the employment opportunities are located within the aforementioned companies, such as Cordis, Pharma Bio Research and Ophtec. To avoid double counts, we shall not take this number of 4000 into consideration. Noteworthy here is also the fact that next to the AZG the so-called 'Meditech Center' has been established for the housing of young fast-growing companies in the biomedical/biotechnological sector.

At the end of our (long) survey about companies locationally linked to the RUG we can come to a conclusion that, given the method of data collection, it is not complete, but in any case not an overestimate either. All categories and individual companies together amount to at least 5900 jobs: 1900 at spin-off companies and 4000 at spin-ons: companies for whom the RUG was location factor no. 1. We then counted half of the jobs at Zernike Science Park as spin-on and the other half as spin off. Just as was the case with the earlier mentioned direct employment effects of the RUG and the AZG, we must now add the multiplier effect in the services sphere ('purchasing power effects') to the 5900 jobs at RUG-related companies. Most of the business here referred to is high value and as with the RUG and AZG can be counted with a 50% multiplier. For the 2000 jobs with call centres we count a lower multiplier of 30%, and then take half of that again because the concurrent follow-up effects partly occur through the student income that we have already counted with the purchasing power effects of the entire student population. Calculated in this manner, the purchasing power effects amount to 2250 jobs in the service sector and the employment in the category 'university as location factor' comes to a total of $5900 + 2250 = 8150$ jobs.

9.10 External effects; the relevant region

The last part of Vermeulens spatial model of educational functions are the so-called external effects, described by him as 'the positive effect on all manner of social aspects in a region (social, cultural, health care etc.), which have in an indirect way, positive repercussions on the socio-economic development of a region'.⁸⁸ He calls these effects difficult to identify and difficult to quantify. This is surely true and not something we will attempt to do here. It should be pointed out, however, that external effects are determined in large part by the image of the region. After all, the image of a region being less or more positive with most of its audience (such as entrepreneurs, inhabitants, visitors, tourists, and last but not least: students) is of great importance for economic development. For the province of Groningen we possess quite a reasonable idea of the external image since the late 1980s, gathered from the measurement of effects of the provincial promotional campaign 'Er gaat niets boven Groningen' (Nothings tops Groningen). It shows a clear increase in importance of the RUG and AZG in the

⁸⁸ Vermeulen, Knowledge still travels on foot, 72.

public image.⁸⁹ These measurements also show that the 'educational opportunities' in Groningen is the aspect of the image that is associated most positively by far (namely by 90% of all Dutchmen). It takes away all doubt as to the crucial economic importance of the RUG for the image effect of the region of Groningen.

Because the city, the province and the university all carry the name 'Groningen', it is almost inevitable that the province will be regarded as the region belonging to the university. With regard to image, this is indeed correct. But in the regional-economic effects of the university discussed earlier, a variety of spatial scale levels have been looked at. When talking about the meaning of the student population for the cafes and restaurants sector, the city was the main focus; for the purchasing power effects of the RUG employees and the image effects the province was the main focus; for qualification effects on the labour market, the North of the Netherlands was referred to; and R&D effects cover the entire Netherlands. It begs the question whether or not there is just one specific region that is economically linked to the RUG. The answer is: not really. It depends on the economic function you focus on. Florax has also pointed out that the determination of economic effects of universities heavily depends on the region you look at.⁹⁰ It does not seem too complicated for the RUG. Considering the sum of the different sorts of effects, it mainly seems to concern the province of Groningen and the top part of Drenthe, because it is here that the vast part - that is, 90% of employment - and purchasing power effects of the university has its effect, and it is here also that the vast majority of RUG-related companies is located. For our conclusion concerning the economic effect of the university, we shall therefore regard Groningen and the North of Drenthe as the relevant region.

9.11 Conclusions

In his contribution of the celebratory collection of essays for the occasion of the quartercentennial of the province of Groningen, Professor of cultural history Klaas van Berkel argues that 'the economic importance of the university (is) only interesting the last half century. Before the Second World War, the university was small and economically inactive and before 1815 (when the RUG was converted from a provincial to a national university; PHP) there was certainly no financial injection from outside the region'. Using some of the same sources of regional-economic impact from the last half century, like De Jong and Florax, Van Berkel then states that in the current period we should not have

⁸⁹ W.J. Meester, J. Waalkens, P.H. Pellenbarg, Effectmeting 1996 Er gaat niets boven Groningen (Groningen 1996); W.J. Meester en P.H. Pellenbarg, Effectmeting 2000 Er gaat niets boven Groningen (Groningen 2000); W.J. Meester, P.H. Pellenbarg, P.J. de Graaf, W.F.H. Kiel, R.L. Osinga, B.A. de Vries, Effectmeting 2002 Er gaat niets boven Groningen (Groningen 2003).

⁹⁰ Florax, De regionaal-economische betekenis van de universiteit, 362.

'too many expectations of the catalysing effect of the university for the regional economy'.⁹¹

Table 9.5 Total direct and indirect employment linked to the RUG and AZG (number of jobs with a minimum of 12 hours)

<i>Effect type</i>	<i>Number of Jobs</i>	<i>Explanation</i>
RUG	5,400	direct employment
AZG	7,000	direct employment
Suppliers	1,000	employment with suppliers of the RUG and AZG combined
Qualification-effects	200	employment effect of the € 22 million regional education impulse
R&D effects	PM	
Spin offs	1,900	half of ZSP* companies, and 50 wp AOG
Spin on's (attracted firms)	4,000	half of ZSP* companies; call centres 2000 wp
Purchasing power c.q. service effect		
- for RUG, AZG, suppliers and students	9,800	incl. 50% multiplier of the qualification effects
- for <i>spin offs</i> & <i>spin on's</i>	2,250	50% multiplier; with call centers (half of) 30%
External (image) effects	PM	-
<i>Total</i>	31,550	-

Note: *ZSP=Zernike Science Park.

Source: Own elaboration.

Van Berkels assessment that the university has only had an economic impact over the last half century is certainly correct. But even then 'not too many expectations of the catalysing effects'? That surely seems too negative. This qualification may be warranted for the results of De Jong, whose 1967 input model estimated the economic effect of the RUG at no more than 2.5% of the provincial product. But when Oosterhaven and Stoffelsma come up with 5% in 1983, it is already a number that can no longer be ignored.⁹⁴ Our broader

⁹¹ K. Van Berkel, 'De regionale betekenis van de Groningse universiteit. Een verkenning van vier eeuwen geschiedenis', in: P.Th.F.M. Boekholt, A.H. Huussen jr., P. Kooij, F. Postma, H.J. Wedman (eds.) *Rondom de reductie. Vierhonderd jaar provincie Groningen* (Assen 1994), 190.

⁹⁴ Florax, *De regionaal-economische betekenis van de universiteit*, 362.

estimate aided by Vermeulens function model even gives us a much higher number for the current situation. In table 9.5 all functions from that model for which we could ascertain a number of concurrent employed persons are collected and accumulated, leading to a total of 31.550 jobs directly or indirectly linked to the RUG and the AZG. We estimate that 90% of that, or 28,400 jobs, are situated in the city and province of Groningen and the North of Drenthe. By the North of Drenthe we count the municipalities of Noordenveld (including Roden), Tynaarlo (including Zuidlaren) and Assen. The province of Groningen contains 220,000 jobs (of 12 hours and more) and the North of Drenthe 48,500, totalling 268,500 jobs.⁹⁵ The 28,400 jobs linked to the RUG and AZG are 10,6% of that total.

A regional economic effect that runs between 10 and 11% of total employment in the direct surrounding region (and half of that number for the entire northern Netherlands, i.e. 5.2%⁹⁶) cannot be disregarded. In fact, this is actually an underestimate because some posts have been added pro memoria - such as the not unimportant image effect - and the location effects could only partially be determined. And particularly in the area of location and external effects lie the prospects for further growth of the regional-economic significance of the RUG for the region. New projects in which knowledge relationships between northern business and the RUG play a part are constantly presenting themselves. A current example is the Energy Valley project, where the aim is to develop an infrastructure for energy knowledge in the North. The RUG participates in this since 2002 by means of the Energy Delta Institute, which strives to become an international academic knowledge centre on matters of energy. More initiatives of this kind, more spin-offs, more biotechnological and other high value businesses that come to the Science Park or to other parks developed in and around the city, and last but not least, more students, probably increasingly from abroad, can make the economic significance of the university grow even further in the fifth century of its lifetime.

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⁹⁵ L. Broersma, D. Stelder, J. Van Dijk, Noordelijke Arbeidsmarkt Verkenning 2004. Achtergrondrapport (Groningen 2003)

⁹⁶ 5,2% is 31.550 as percentage of total employment in the northern Netherlands. According to Broersma et al., Noordelijke Arbeidsmarkt Verkenning 2004, the total employment in 2002 runs to 605.449 jobs of 12 hours and more.

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10

Learning Regions - Summary of Theoretical Resources and Practical Use in Regional Development

Zdeněk Fischer, Labour Market Institute in Ostrava

10.1 Theoretical Resources and Elaboration of Lifelong Learning Problems in Development Programme of Moravian-Silesian Region

Lifelong learning is included in the priority field “Successful People” (Education and Employment) in the draft of updated version of Development Programme of Moravian-Silesian Region drawn up at the end of 2005.

Priority field encompass 11 measures further subdivided into activities. All these mentioned measures, in a different extent, concern lifelong learning questions.

Following table is concerned with subdividing of measures into three categories by importance in terms of support and development of lifelong learning.

Table 10.1 Subdividing of measures into three categories by importance in terms of support and development of lifelong learning.

Updated Development Programme of Moravian-Silesian Region, priority field "Successful People" (Education and Employment)		
<i>Measure Number and Title</i>		
<i>Key linkage to lifelong learning</i>	<i>Significant coherency with lifelong learning</i>	<i>Support role for lifelong learning</i>
3.2 Development of lifelong learning system for better training and adaptation to changing demands of labour market	1.2 Development of foreign language communication skills of citizens, especially in English language	1.3 Development of competences for employability improvement
1.1 Development of information skills of as broad spectrum of citizens as possible	3.1 Development of capacities of the educational institutions with high-tech equipment and educational programmes for practical training of the present and future employees	2.1 Development of educational institution capacity for vocational training for strategic branches
2.4 Better assertions of qualified persons in applied research and commercial use of its results	4.2 Barrier less access to business activities training for all the interested persons	2.2 Precaution of qualified people leaving outside the Moravian-Silesian region
		2.3 Specific support of motivation of students and their families to education in technical professions, including higher involvement of women into this professions
		4.1 Specific motivation of teachers and students, and help to school for system development of go-aheadness

Source: Own elaboration.

Detailed text – activities reasons and description – is further given in measures with identified key linkage or significant coherency with lifelong learning questions (see table 10.1).

Measure: 3.2 Development of lifelong learning system for better training and adaptation to changing demands of labour market

Measure reasons

Change of employment relationship culture to flexible labour force, highly motivated to work and well adapted to the labour market changes is the important aspect of competitiveness. Educational system still does not practice people sufficiently to the fact that they will have to change their job, even the profession or at least great deal of its content several times during their life. Lifelong learning systems are creating for the time being as well as the whole-society climate that would motivate people (individuals) to be responsible for their own success in the labour market, and companies to higher extent of social liability for their employees' professional adaptability. In term of accession to European Union, the new opportunities connected with using of European Social Fund appear in the field of lifelong learning.

Activities

The main activities within this measure are:

- Development of the network of local lifelong learning centres in Moravian-Silesian Region and their cooperation in education offer propagation

Network of local lifelong learning centres is progressively being developed in Moravian-Silesian region. Within the Programme PHARE, Moravian-Silesian region such as Vysočina region was chosen for realisation of pilot Lifelong learning centre. At the national level, total concept of lifelong learning is being developed so far. It is necessary all of these activities to be harmonized in future in order to conform to the needs of the region and to the development of education and competitiveness. Financial model to enable functioning of these centres will be necessary to establish as well.

- Use of existing private educators' capacities for lifelong learning of Moravian-Silesian region citizens

There exist many private educators in Moravian-Silesian region who can be appropriately engaged in lifelong learning system. Usually these private institutions are able to flexible react on demand, including project working out to co-financing from Structural funds. At the regional level, system for the permanent improving quality of this type of education and institutions, which provide it, is necessary to be developed and implemented. Tools for certification of institutions and their educational programmes and lecturers, and also tools for education results assessment using the employer's feedback, are connected with the quality improving mentioned above.

Measure: 1.1 Development of information skills of as broad spectrum of citizens as possible

Measure Reasons

Moravian-Silesian region would like to be a region offering competitive labour forces for the promotion of the entrepreneurship and currently supporting its citizens to develop their key skills required on the labour market. One of the main skills considered is the information skill and its development and improving.

Activities

Possible activities within this measure are:

- Easy availability of quality information skill training programme for interested persons of different level of information and communication technology knowledge

There exist developed network of educators in this region, which could be used to provide quality training programmes of information skill in a whole process of lifelong learning. Sufficiency of well-equipped computer classrooms, capacity of lectors and financial resources for cost payment is the basic condition. Considering that, it is possible to use project co-financed from ESF.

- Offer extension of IT use to citizens – Internet cafes, Internet corners in public buildings etc.

In spite of the fact that the families are gradually better equipped with computers, many people who do not have access to information technologies still exist. In context of so-called e-state development, share of electronic interaction between citizens and institutions will increase. Information skill development and economic and educational development based on information and communication technology belong among the objectives of Moravian-Silesian region. These objectives could be practically promoted and fulfilled by wider offer of public places with free access to computers and Internet.

- Better readiness of primary and secondary school teachers for developing pupils and students information skills

According to the available inquiries, it is possible to say that only 1/3 of Czech teachers are information skilled in the sense of ability to adequate use modern information and communication technology. In terms of the change of education to better and active use of information, it is necessary teachers to be such persons who are able to use information technology potential in education process. Information search on Internet and their active connection with study subjects should be obvious. In this context, it is possible to use combination of teachers training with their references and qualification for work at school.

Moravian-Silesian region priorities for the development of IT skills in education are required to be laid down.

– Setting-up of broadband Internet – households

Broadband Internet setting supports further extension and better work with Internet. Private sector activities and their efficient connection with strategy of the region could be used to broadcast this technology into the households of Moravian-Silesian Region. Particularly it can concern indirect projects support.

– Growth of absorption capacity of Moravian-Silesian region to programme use (state, EU) to information structure development, PC availability and information skills development

Knowledge society development is one of the priorities of the European Union as well as the Czech Republic. To this priority answer the intent of programmes which can be co-financed from EU structural funds. Preparation and realisation of projects, which will interconnect EU and CR strategic objectives with Moravian-Silesian region objectives in the field of the “hard” information and communication infrastructure as well as the “soft” one in the field of citizens education and information skills development, will be the main tool of public financing.

Measure: 2.4 Better assertions of qualified persons in applied research and commercial use of its results

Measure reasons

Development of the strategic fields with high growth potential and positive impact on GDP generation can be positively influenced by the cooperation between organisations and individuals in the field of: a) education, b) applied research and development, c) commercial use of innovation (by market sale). Involvement of public sector to creation of favourable conditions is particularly important here. Especially it concern overcoming the “incubatory” period, before all the persons involved start to aware of benefits of this connection, and before the whole system becomes attractive for private sector as well. Development of Science and Technology Park in Ostrava – Poruba presents the great example of these activities. Further development of Science and Technology Park of Ostrava and its connection with new activities and tools is the object of this measure.

Activities

The main activities within this measure are:

- Development of Science and Technology Parks and innovative incubators

Science and Technology Park of Ostrava present activity which support promotion of innovative companies and creation of new qualified jobs. Preliminary period was particularly aimed at building up “hard” infrastructure of Science and Technology Park and filling the first building with the companies. Based on demand confirmation for these spaces, further extension of infrastructure follows. Future development of Science and Technology Park will be aimed at also “soft” factors, including activities leading to better connection of the research and development and the practice. Creation of the new innovative incubators, where will be optimal conditions for establishing and initial development of new technological companies that will pass research results to practice, belongs to this field as well.

- Knowledge campuses

Within this activity, it will concern better connection between companies and universities, particularly VŠB – Technical University of Ostrava, in realisation of joint research and development actions.

- Establishing and development of the centres of excellence

Strengthening of competitiveness in defined branches can help to establish and further develop so-called centres of excellence.

- Promotion of floatation/establishing and development of companies to commercial use of research results

This activity is connected with creation of spatial (innovative incubators), financial (initial capital) and educational and consultancy conditions for establishing new companies based on research results transfer to the market.

Measure: 1.2 Development of foreign language communication skills of citizens, especially in English language

Measure reasons

Moravian-Silesian region wants to be a region which offers competitive labour force for entrepreneurship development and currently helps to its citizens to improve key competencies required on the labour market. One of the main competences in this sense is the ability to communicate in foreign language, particularly in English.

Activities

Possible activities within this measure are:

- Promotion of establishing of new schools providing education in English language

The offer of comprehensive education in foreign language (nursery schools, primary and secondary schools) for foreign workers families acting in the region, presents one of the efficient incentive for gaining investors and qualified specialists as well as for presentation of Moravian-Silesian region as a competitive region. This offer can be interesting for local people who want and can invest in education of their children as well. Financing of this activity is supposed to be supported by parents.

– *Steady development of language education at schools in this region*

Beside the education in English language, there is a need to extend and improve quality of the language study in every type of school. It will be necessary to extend capacity and increase quality of lecturers of English and other foreign languages. Local teachers as well as the native speakers who have already worked in local schools (or can come to start) can help within this activity. Within this activity it is possible to support incorporation of some subjects or just some of their parts into the education in foreign languages, particularly in English. Develop area testing of knowledge and skills in English at basic and secondary schools.

– *Encouraging teachers world language learning*

Language education of teachers of non-language subjects is condition to fulfil previous activity. Then they will be ready to open world of education to themselves and their students, no matter special literature or work with internet is concerned. Ability to commonly use foreign language text in teaching, eventually to teach ones subject or its part in foreign language (esp. in English) is the highest level of their readiness. Moravian-Silesian region henceforth will support educators and students to participate in programmes Leonardo and Socrates.

– *Extension and easy availability of basic level English courses for all the interested persons, with special attention to unemployed, including low qualified and elders*

Experience from foreign countries illustrate that one of the most effective tool for preparation on EU admission was such a massive education in English, not only of the students but adults as well. Ability to communicate in foreign language increases individual competitiveness on the labour market. Foreign investors often train their employees in their native countries and require at least minimum knowledge of foreign language on blue-collar workers level. Financing of these language courses should be available with using of European Social Fund resources.

– *Bilingual guideposts installation for significant institutions and monuments – service for foreign visitors as well as the support of local people language learning*

Through analysis of foreign visitors' requirements was found that the bilingual guideposts would be welcomed for better orientation in Czech towns. It concern also Prague which profit from tourism most of all. Guidepost in Czech language to the important institutions and monuments are possible to find in every bigger town in Czech Republic. By installing of bilingual guideposts, Moravian-Silesian region can present itself as a region "friendly" to the foreign visitors. Currently it would mean the spontaneous support of language learning for all group of local people. This activity could be prepared and financed as a project which quickly attract the attention and convince of strategy fulfilment in this field.

- *Use of TV digitalisation for Moravian-Silesian region educational channel creation and operation – foreign language programmes with titles, using for other educational activities of Moravian-Silesian region*

From language education to ability foreign language use in practice is a long way coming over everyday or at least frequent training, to what it is necessary to be highly motivated and have needed opportunity. Educational channel of Moravian-Silesian region using technological development in the field of TV digitalisation could be one of the important tools. Educational channel could be a joint project of public and private sector, including non-governmental and non-profit-making educational organisations involvement. Many projects already realized or prepared to the future can be used to create a programme.

- *Creation and accessing e-learning educational programmes*

E-learning programmes can significantly help to improve availability of educational programmes to user comfort (choice of place and time of study according to possibilities and needs). E-learning programmes currently support development of citizens' information skills. Considering that it is convenient to use so-called b-learning (blended learning) otherwise combination of computer-assisted individual learning with personal contact with lecturers. More frequent use of these tools can also support promotion of technologic and educational companies which are especially aimed at this type of service.

- *Working-out the technical subject dictionary of basic terminology*

Terminology knowledge is particularly important for communication with others in certain profession/branch. Working-out dictionary of basic terminology for defined technical branches, especially for the key ones with development potential in Moravian-Silesian region, can help to better communication.

Measure: 3.1 Development of capacities of the educational institutions with high-tech equipment and educational programmes for practical training of the present and future employees

Measure reasons

Sufficient offer of qualified workers of technical professions is one of the main conditions of development of the enterprises being in the Moravian-Silesian region. More and more of these companies are involved in global market to what do answer their technological equipment such as multidimensional machine tool etc. For many educational institutions, it is difficult to keep up with the technical development; it is connected with high cost what they do not have resources for. This situation offer great space for intervention of public sector, including use of EU structural funds, and for shared use of technology. It can concern already existing programmes such as “training centres” provided by Ministry of trade and industry, or development of a bigger system project of the regional level for 2007 – 2013.

Activities

The main activities with this measure are:

- Creation and keeping of professional centres for practical training within Moravian-Silesian region

Quality growth of practical training according to requirements of employees is often limited by differences in technological equipment of companies and educators. The accelerating of innovation cycles and financial requirements of the new technology purchase make more difficult to adequate readjust technological equipment in schools, particularly in training centres and technical schools. One of the possibilities how to break this barrier is to establish professional centres for practical training, particularly centres for key branches of region. Just to these centres, the investment activity in purchase or operative leasing of new technologies could be concentrated (possibly with use of structural funds). Mentioned centres could be established within the range of existing network of schools, eventually within the certain centres of lifelong learning. In such equipped centres, the access to their use would have to be ensured for number of educators who could rent needed space here for their educational activities.

- Introduction of financial model for employers participation in operation of practical training centres

Initial investments from public fund for establishing profession centres of practical training should be supported with private resources. Employers, who will use advantages of better awareness of employees, are necessary to be involved to financing educational activities of these centres. In the communication with employers and their associations and chambers, it is necessary to establish financial model which would ensure financial sustainability of practical training centres. Along with the co-financing requirement, the offer of higher involvement into centre strategic control will be solved.

Measure: 4.2 Barrier less access to business activities training for all the interested persons

Measure reasons

Moravian-Silesian region has very good initial conditions to entrepreneurship training facilitation for all the interested persons. Since 1992, the highest quality and locally the most available network of the regional consultancy and info centres for entrepreneurs, has been developed within the Czech Republic. Every interested person in this region can reach the nearest centre by 30 minutes by car. One of the branches of Bohemian and Moravian Guarantee and Development Bank, specializing in small and beginning entrepreneurs, has its domicile/seat in Ostrava. Since 2003 these services have been completed with network of SBC – Start Business Centre for the interested persons who just consider business enterprise. It concerns the pilot project result within whole Czech Republic. Employment offices also provide subsidies to entrepreneurship interested persons to education and starting business activities. Mentioned organisations dispose of proved products and services which serve to business enterprise preparation and beginning. It concern the basic institutions network which can be used to further extension of quality services for entrepreneurship interested persons and beginning entrepreneurs. Beside these, Regional Economic Chamber and Dalkia Fund for beginning entrepreneurs work well in this region.

Activities

The main activities within this measure are:

- Wide offer of courses and consultancy assistance for interested and beginning entrepreneurs

Use of the existing network of Regional info and consultancy centres, Start Business Centres and other educators in Moravian-Silesian region to interested and beginning entrepreneurs support. Considering that it will concern particularly initial identification of business potential, promotion of motivation to start entrepreneurial activities, entrepreneurial minimum courses for beginning entrepreneurs, consultancy assistance during the first year of independent entrepreneurship, programmes for financial recourses ensuring to start business activities etc.

10.2 Brief introduction of pilot project “Learning Bruntál region”

Project presents one on the pilot practical examples of local initiative prepared by Bruntál city joint with the other regional partners.

Project “Learning Bruntál Region” is situated into the city of Bruntál and its surroundings, and conform to the development plans of Bruntál region.

Project objective is to increase professional and pedagogic skills of lectors, tutors, teachers, methodical and management staff acting within lifelong learning system in Bruntál region.

Project content is to create/establish personal background for prepared comprehensive service centre of lifelong learning – Multifunctional centre of lifelong learning and pedagogic workers education through the vocational workshops of Bruntál.

The main project outputs will be:

- Qualified team of workers for lifelong learning centre of Bruntál region (management, lectors and consultants) able to realize strategic plan of education development of Bruntál region.
- Educational programmes development in connection with labour market requirements.

Material and technical equipment of the classrooms and other project results presentation through the publicity matter will be the results of this project. Project can significantly promote communication between social partners in region and strengthen partnership principle. Project could be a model example how the public service and employers together can increase efficiency of the unemployed motivation incentives to support these citizens to return to job or to find a new job. Also the ways how to increase efficiency and effectivity of the active employment policy use in this region will be looked for.

Project end-users:

- Centre staff – lectors and tutors, teachers, methodical and management staffs who will have to be specialized in concrete specific skills and knowledge needed to ensure functioning of centre.
- Schools aimed at promotion of vocational competences of educators participating in education offer drawing.
- Bruntál city as a central situated gravity municipality significantly improve own image, as well as the image of Nízký Jeseník territory. It will become a natural place of education growth promotion. Centre opening will mean creation of regional symbol presenting improvement of the educational structure of citizens.
- Non-profit making organizations.

Project is applying for support from EU Structural funds and from Czech State budget.

10.3 Lifelong learning in prepared Structural funds Operational programmes for period 2007 – 2013

National development plan and operational programmes for period 2007 – 2013 is currently in stadium of working paper. However it is clear that field of lifelong learning will be included particularly in operational programmes “Development of human resources and employment” and “Education” (just working titles).

Global objective of the **Operational programme “Education”** is to reach better readiness of graduates of all educational levels for entry to labour market by means of educational system improvement. All the education access barriers should be minimized. Through the cooperation between employers and social partners, access to lifelong learning should be enabled to each citizen in any stage of his life.

Specific objectives of the operational programme “Education”

1. Modernization of education system of initial and further education (access improvement, systematic increase of quality and effectivity of education).

Within this specific objective curriculum responsive to labour market requirements will be implemented into everyday school practice. Quality evaluation tools in education destined for internal and external school assessment will be introduced. Further education of pedagogic workers in the field of curriculum and evaluation will be realized as well.

2. Creation of comprehensive system of lifelong learning (involvement of informal education).

Specific objective include opening of schools to all interested persons in lifelong learning, creation of further education system with the participation of social partners, and training of workers responsible for the offer creation and lifelong learning management.

3. Increase of labour force vocational qualification within productive age.

Interventions within this objective will be aimed at creation of sufficient offer of means of education for all.

4. Development of educational infrastructure according to current practice requirements and knowledge emergence.

Specific objective will be fulfilled through interventions toward school equipment which answer current development and modern educational methods.

5. Educational system opening to society and involvement of the main partners participating in human resources development.

Within this objective activity concerned to the teachers and social partners involvement into definition of new education content and creation of curriculum documents will be supported.

Global objective of the **Operational Programme “Development of human resources and employment”** is to increase employment and economic growth through development of effective and flexible labour market, qualified and competitive labour force and integration of social excluded persons.

Specific objectives of the operational programme “Development of human resources and employment” are:

1. Adaptability improvement of workers and employers through development and realization of vocational education systems and strategies with the objective to increase companies' investments in education and to increase participation of employees in vocational education. Promotion of system development for economic changes forecasting.

This objective will be fulfilled through the interventions aimed at unemployment prevention by means of support of investments in human resources, by development of professional knowledge, competences and qualifications of employees and employers, by systems for forecasting future working and qualifying requirements, and by development of specific services in the field of employment, vocational training and employees support according to the restructuralisation of companies and branches.

2. Better access to employment and prevention of unemployment, particularly long-term unemployment of older workers, through the realization of labour market active policies and development of active employment policy tools.

Interventions within this objective will be aimed at employment access improvement and steady inclusion of employment seeking persons, and further at unemployment prevention, particularly long-term unemployment of older workers. Emphases will be laid on individuals and on choice of such tools which can best promote his integration into sustainable job.

3. Reinforcement of integration of the persons threatened with social exclusion, development of institutions and quality of services aimed at social integration and removing of barriers embarrassing participation on labour market, including gender discrimination.

Interventions within this objective will be particularly aimed at support to social exclusion threatened persons or social excluded persons, namely by direct support of these persons and by increasing quality and availability of social service, including reinforcement of local partnership. Measures towards increase of employability of these persons and measures towards better compatibility of family and occupation will be supported. Promotion of equal opportunity of women and men on labour market will be supported as well. Particular attention will be given to members of gipsy community and migrants and the other groups from different socio-cultural environment. Social inclusion of disadvantaged group of citizens will be supported particularly through support of subject providing social services leading to integration into labour market and society. Emphasis will be laid on development of social service system particularly by mean of further education of social workers and workers acting in social services.

4. Lifelong learning support through the increase of availability and quality of further professional education offer in terms of knowledge society needs and labour market requirements.

Within this objective interventions aimed at increase of availability and quality of further professional education offer in out-schools educational institutions in terms of needs of labour market and knowledge society will be supported.

5. Institutions modernisation and reinforcement regarding the need of effective realisation of active employment policy and flexible labour market.

This specific objective will be realised through interventions aimed at improvement of quality of services provided by institutions on labour market. Effectivity improvement and institutions reinforcement on labour market and in

the field of social integration will be supported, regarding need of effective realisation of active employment policy, flexible labour market and integration of social exclusion threatened persons.

Regional operational programmes (ROP) will include activities which are in competences of regions and municipalities, and which can significantly contribute to the development of regions.

Global objective of the **Regional operational programmes (ROP)** is aimed at accelerating of development of Czech regions and increase of regional competitiveness, and promotion of living standards of citizens, with respect to balanced and sustainable regional development and better use of potential of the regions. Such defined global objective of ROP take into account and follows global objective of National development plan.

Specific objectives of the ROP will be oriented to conditions of cohesion regions, their development strategies and priorities. It is possible to expect that ROP will contain supporting measures and activities for the human resources development by lifelong learning.

Operational programmes of cross boundary cooperation could be the next support tool.

Global objective of the Operational programmes of cross boundary cooperation is to support economic and social integration of border territories through removing of persisting barriers and reinforcement of their development potential. Mutual economic, social and cultural relations, common natural resources tending, tourism development and flexible labour market promotion will be reinforced by means of joint interventions.

Promotion of cooperation, support of education, research and development, culture support, support of labour market integration and social inclusion and support of small local initiatives, and socio-economic activities with aim to support projects as "people to people", are also included among the specific objectives of Operational programmes of cross boundary cooperation. The opportunity for lifelong learning development and support occurs in this operational programme as well.

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11

On the Dichotomy of Contemporary Regional Development in Transition Economies

Jiří Kern, VŠB – Technical University of Ostrava

Jan Malinovský, VŠB – Technical University of Ostrava

Jan Sucháček, VŠB – Technical University of Ostrava

11.1 Introduction

The number of theories concerning regional development has permanently increasing tendency. Individual theories differ not only in terms of the delimitation of principal actors and mechanisms of regional development but also in the sphere of recommendations for regional policies formation. The notion of development itself bears also rather different and often almost antagonistic meanings. Not surprisingly, there exists nothing like commonly accepted paradigm on regional development so far.

As it will be shown, in the course of last two or three decades the move from exogenous approaches towards regional development that rely on inner potential became tangible. However, rather than by remade endogenous doctrine, exogenous Keynesian paradigm was replaced by new neo-endogenous doctrine, which accentuates the creation of general conditions for the stimulation of inner endogenous developmental possibilities in individual regions. Neo-endogenous stream of regional development was formed as an intersection of new conceptions, such as learning regions, flexible specialization or industrial districts that underline the importance of profound spatial differentiation in institutional characteristics. Current neo-endogenous and to a certain extent eclectic stage of regional development is path-dependent upon the history of regional development paradigms.

The objective of this chapter is to show that basically all transition countries find themselves under the strong pressure stemming from the endeavour to apply neo-endogenous approaches to the regional development that are currently in vogue. The key cause of this strain consists in the presence of deformed system macrostructures, which embody the heritage of socialist times. The problem of the tension between neo-endogenous practice of regional

development and dysfunctional system macrostructures that actually form the wider framework for all spatial processes in transition countries is stated only seldom, nonetheless it becomes increasingly palpable issue in these economies. And that is why the applicability of learning regions in transition countries constitutes increasingly debatable issue.

11.2 Basal Approaches to the Regional Development

Regional development should be perceived as the whole complex of processes running inside the region. These processes constitute the basis of the positive changes in region with regards to economic, social, environmental, cultural, psychological and many other characteristics. However, there are only little doubts that genuine regional development can be only hardly reached without regional economic growth.

The number of conceptions that intend to account for the developmental processes in space corresponds to the latitude of the perception of regional development. The quantity and strongly differentiated nature of theories on regional development causes numerous problems with their classification. And learning regions brought further enrichment to the motley regional development domain. Not surprisingly, there is no united concept of regional development theories so far. With regard to afore mentioned facts, teleological principle is rather frequently utilized in order to simplify the creation of the typology of these theories.

As it is visible in table 11.1, regional development approaches are distinguishable as follows:

- Interventionist, i.e. Keynesian and extremely interventionist Marxian-Socialist,
- Non-interventionist, i.e. strongly non-interventionist liberal paradigm and rather non-interventionist modern neo-endogenous conceptions of regional development.

In other words it is possible to talk about 'top-down' conceptions that rely upon the outer interventions and are inherent to Keynesian and Marxian-Socialist paradigms on the one hand and 'bottom-up' approaches, which emphasize the stimulation of inner regional developmental potential and are typical for liberal and modern paradigms of regional development on the other hand. The latter includes also learning regions.

Table 11.1 Chronological View on Regional Developmental Paradigms

<i>General Paradigm</i>	<i>Characteristic Features</i>	<i>Typical Regional Policy</i>
Liberal/non-interventionist/ endogenous development	Convergent spatial development, there is no necessity to intervene in market forces. Non-interventionist approach.	‘Workers to the work’ school, instruments increasing the labour mobility.
Keynesian/interventionist/ exogenous development	Divergent spatial development, it is necessary to intervene in market processes. Interventionist approach.	‘Work to the workers’ school, tools supporting the inflow of investments into problem regions.
Marxist-socialist/ extremely interventionist/ exclusively exogenous development	Divergent spatial development, necessity of planning and management of spatial development. Extremely interventionist approach.	Central planning and management of spatial development, ignorance of spatial-market signals.
Modern/‘transformed’ neo-endogenous development /formation of frame conditions for endogenous initiatives	Divergent spatial development, however, it is necessary to stimulate inner regional potential. Rather non-interventionist approach.	Support of milieu, which facilitates networking, development of small- and middle- sized firms, innovations and learning. Augmentation of institutional thickness, cooptation (co-operation and competition).

Source: Authors

11.3 Regional Development in Transition Economies in the Context of Deformed System Macrostructures

Modern, neo-endogenous approaches toward regional development, which comprise also learning regions, stress the importance of the stimulation of endogenous potential in the region. At the same time, these conceptions implicitly consider that system macrostructures are distributed in the way, which enables approximately even conditions for the development of individual regions and localities in the framework of the country. In this context, one has to take into account that system macrostructures bear distinct spatial dimension, which principally influences the quality of these macrostructures.

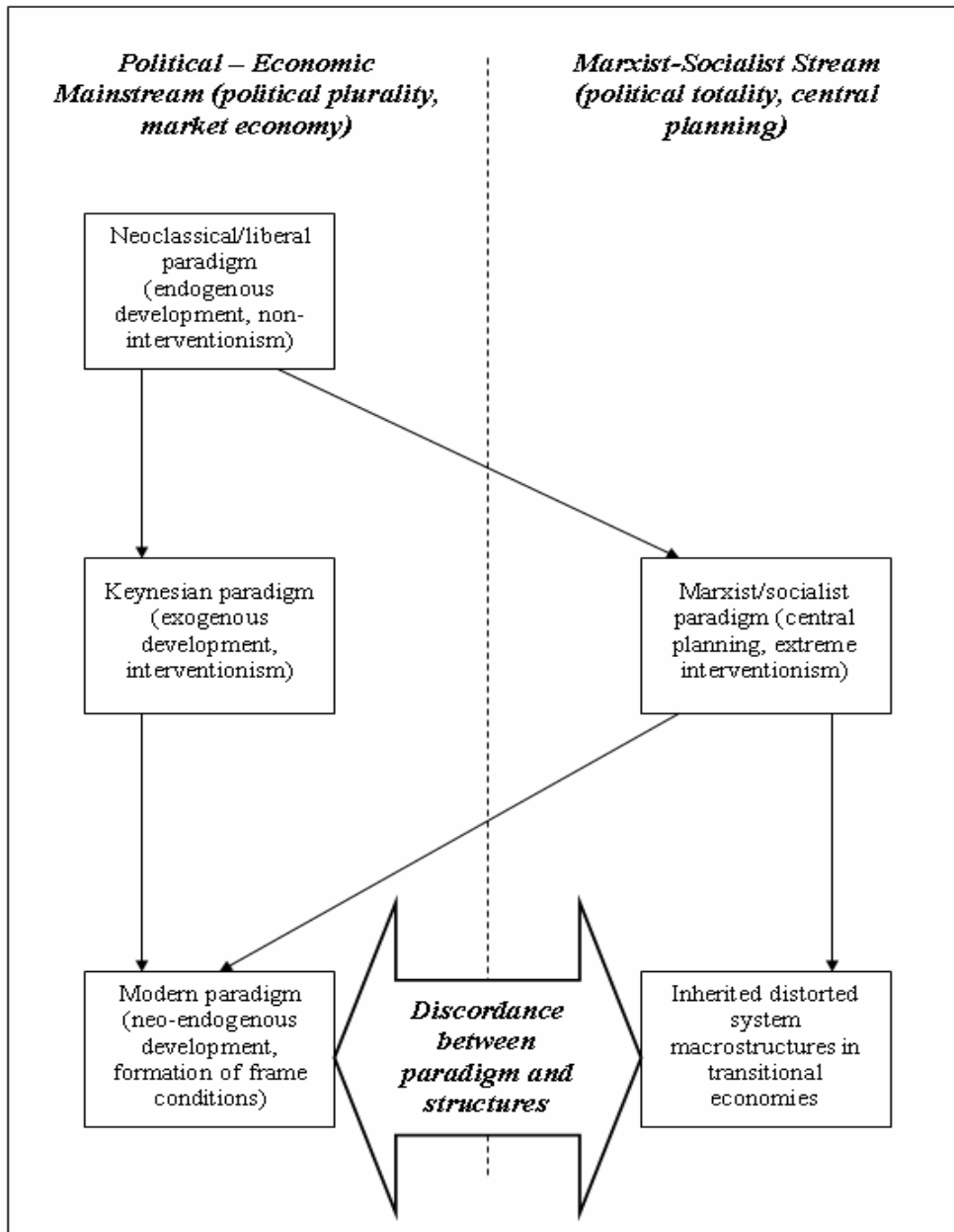
System macrostructures are embodied by public administration (namely the power and manoeuvring space of state administration and self-government from financial perspective as well as the organisation of their competences) or by both physical and social infrastructure. There should exist the balance between state administration and self-administration on the one hand and the spatial distribution of infrastructure should be at least approximately bound to the settlement system as well as the overall socio-economic significance of particular territories on the other hand. All of these system macrostructures determine developmental possibilities and limitations of regions. More importantly, all of these macrostructures are formed on the basis of concrete political – economic decisions.

Adequately distributed system macrostructures ensure approximately even developmental conditions for all regions, which is also the prerequisite for efficient accomplishment of modern, neo-endogenous development. However, in reality of transitional economies, the occurrence of qualitatively good and spatially adequately distributed system macrostructures is rather an exception than rule. From this point of view, administrative, infrastructural as well as institutional system macrostructures in contemporary transition economies find themselves in an embryonic stage of their development (see figure 11.1). Obviously, it brings a great augmentation of transaction costs (see for instance Jurečka, 2002 or Sucháček, 2004 and 2005a).

In the following paragraphs, the authors will concentrate primarily upon the Czech Republic as a representative of transitional economies. Czech Republic, from which the authors come from, can serve as an excellent example of dysfunctional system macrostructures. At the same time, comparisons show symptomatically great institutional similarity of Central East European economies that underwent totalitarian political regime and centrally planned economy (see Gorzelak, 1998 and 2000 or Mlčoch, Machonin, Sojka, 2000).

Many times, it has been officially claimed that as a result of central planning legacy, the Czech Republic entered the transformation period as a country with relatively small regional inequalities (see for instance Hampl, 2001 et al). It is true that equalization was regarded to be a truly magic notion of policies based primarily on ubiquitous planning, however, at the same time, it has to be mentioned that in reality the practice was very often distant from officially proclaimed policies. Prokop and Kovář (1987) made a comparison of principal Czechoslovak towns and cities in all basic socioeconomic components of their lives and results brought strongly differentiated picture of Czechoslovak towns and cities.

Figure 11.1: Discrepancy between Modern Paradigm on Regional Development and System Macrostructures in Transition Countries



Source: Authors

Even more importantly, there existed strong administrative-political centralisation of virtually all decisive mechanisms of societal life into the capital

city. This can be perceived as a spatial manifestation of totalitarian political system. This constituted the basis for future development of the country, which is nowadays strongly path-dependent (e.g. Mičoch, 2000).

The function of system macrostructures in contemporary Czech Republic is rather braked and to certain extent deformed by centralising approach of state administration that does not want to give up its financial resources and competences. Subsequently, the self-governance is practically oppressed by an excessive influence of state administration. What appears to be even worse is that administrative centralisation of the country was furthermore fortified in the course of first transitional years, which resulted in the centralisation of other important system macrostructures, such as transport infrastructure that became spatially more centralised too (see for instance Sucháček, 2004 or 2005b).

The key problem consists in the fact that the development in both the Czech Republic and other transitional economies 'jumped over' or more precisely avoided the Keynesian stage of regional development. Deformed system macrostructures that represent the heritage of socialist era disallow an adequate application of modern approaches towards regional development, which are well-known and well-tested in western economies. In comparison with Czech regions and localities, their western counterparts go from approximately equal technical, competential as well as financial categories that evolved in the framework of market economy and political democracy mainly during Keynesian era (see for instance Vanhove and Klaasen, 1987).

Relative consent between transformation of system macrostructures and paradigm of regional policy in individual countries can be perceived as probably the most important element of the whole Keynesian period. In spite of interventionist character of Keynesian doctrine, market mechanism was not replaced in any advanced country. Concurrently existing central planning in combination with political totality in Central East Europe brought the deformation and namely centralization of practically all basic components of life.

On the contrary, the countries that applied Keynesian direction of development were generally able to create adequately distributed system macrostructures that facilitate the development of particular regions and localities principally. Succinctly, advanced countries realized that they cannot afford socioeconomic 'black holes' within their own territories and that more or less evenly distributed system macrostructures ensure the socioeconomic development of the whole country. Not surprisingly, a great decentralization combined with the support of local and regional self-governments took place during the Keynesian and Post-Keynesian period in practically all advanced countries (see also table 11.2).

Table 11.2 Self-Governing Regions in European Countries according to the Date of Origin

<i>Country</i>	<i>Number of Regions</i>	<i>Date of Origin</i>
Belgium	3	1970
Denmark	15	1970
Germany	16	1949/90
Finland	12	1919/86
France	26	1982
Great Britain	78	1972/73
Greece	13	1986
Ireland	31	1889
Italy	20	1948/70
Luxembourg	3	1868
Netherlands	12	1850
Portugal	7	1978
Austria	9	1918/45
Spain	17	1979/83
Sweden	25	1634/1862

Source: Evropská unie od A do Z, Bonn, 1995, Institut pro Evropu

Presently, we can hear almost every day about declining role of state, which is objectively perceptible in many economies. However, system macrostructures, which were created at the central state level played in reality the key role during the transitional period in the Czech Republic. The destiny of individual regions in the Czech Republic is still shaped by state administration that does not want to give up its competences and financial resources. Subsequently, specific, neo-core-periphery pattern of the country has evolved (e.g. Sucháček, 2005a or 2005b).

While in advanced countries both formal and informal institutions crystallized out naturally, in an evolutionary way, in transitional economies, for which numerous developmental discontinuities are characteristic, the informal institutions played a relevant role in transitional years (see figure 11.2). The significance of networking, lobbying or embeddedness is much higher in transitional economies than in their western counterparts. We are talking namely about hierarchical connexions among regional and national actors, which are caused just by insufficient manoeuvring space of self-governments.

Development, which is based on inner regional potential, is both effective and efficient, since it changes the quality of social and economic structures of individual territories.⁹⁷ However, in the Czech Republic, markedly heterogeneous character of system macrostructures very often distorted or even eliminated the endogenous activities of local and regional actors (Jurečka, 2002 or Sucháček, 2005c). The developmental conditions of individual Czech regions turned out to be rather differentiated and very often, one of the most important criteria of success or unsucces is the distance from the capital city (e.g. Varadzin, 2004). In Czech regions, the problem of discrepancy between relatively inertial and non-adequately distributed system macrostructures and neo-endogenous approaches towards regional development appeared.⁹⁸

Formal institutions were not defined well namely at the beginning of 1990-ies (see for example Mlčoch, 1997). Corrective processes that concern informal institutions exposed to fifty years long incidence of Marxist-socialist paradigm on regional development, will probably last two or three generations. Nijkamp and van Geenhuizen (2002) stress that openness and trust constitute pivotal conditions for learning, which is in sharp discordance with informal institutions in transition countries. Obviously, these unfavourable facts afflict the applicability of learning regions in Central East Europe.

It is thus possible to state, that location attractiveness and developmental conditions of particular localities are not given, but formed by concrete regional-political decisions and measures taken mainly by central institutions. Constitution of qualitatively good system macrostructures represents the first challenge in the process of the return to the natural developmental track. However, it is only requisite, but not sufficient condition, since history does

⁹⁷ Genuine regional development can be reached only via the stimulation of inner endogenous potential of localities and regions. Exogenous interventions cannot be entirely eliminated but they should act just as a complement to the endogenous activities of localities and regions. It is obvious, that only the change of aforementioned existing socio-economic territorial structures can initiate the real regional development. However, the process of the change of the quality of these structures does not necessarily come after external interventions. Excessive exogenous interventions always involve the threat of the ossification of old, inertial social, economic and institutional structures in the given region.

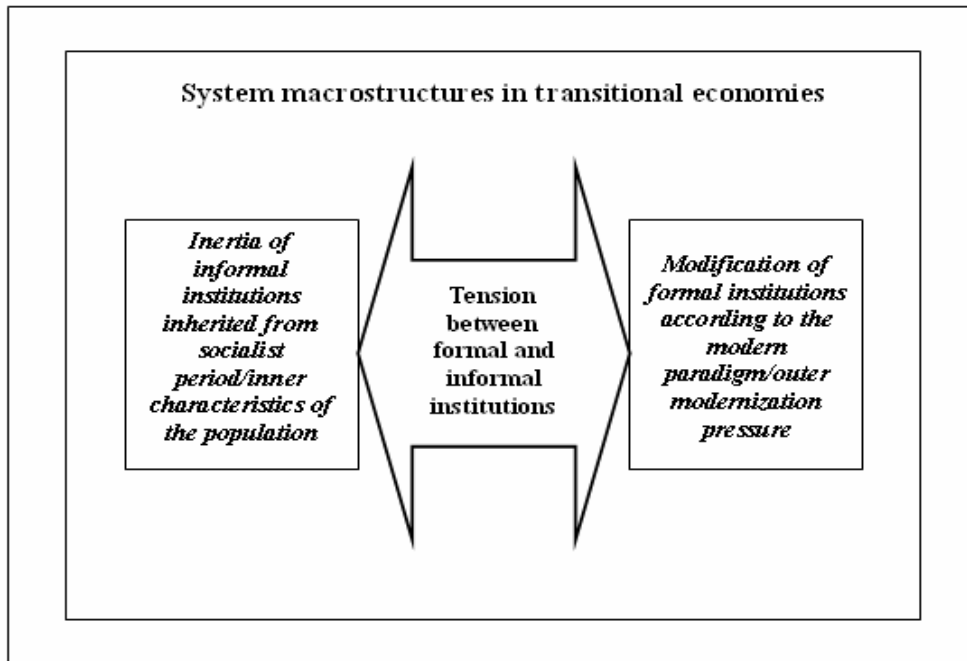
⁹⁸ The problem can be examined also from the different perspective: apart from 'common' physical geographical distance it is possible to distinguish next three types of distances:

- Psychological distance that corresponds to the perception of particular places. Less developed regions are usually perceived as more remote than they really are. It leads to the creation of mental maps that reflect the image and the reputation of places.
- Economic distance, which expresses the costs necessary for surmounting the certain distance and is dependent on the physical infrastructure.
- Hierarchical distance that reflects the position of municipality within the system of public administration, but also the socio-economic importance of municipality. Big centre is hierarchically much closer with another big centre that lies far away than with the village in the vicinity.

These distances should be relatively (i.e. with regard to the settlement system) as small as possible, mainly if we are talking about the distance between main centres and 'common' municipalities. Apparently, built-in mechanisms of spatial development in the Czech Republic tend to prolong the above-mentioned distances.

matter and the redress of informal institutions is undoubtedly the question of longer time.

Figure 11.2 Inner Institutional Tension of System Macrostructures in Transitional Economies



Source: authors

Put succinctly, one has to consider the influence of system macrostructures, which do not ensure standard developmental conditions for all regions and localities. This fact is detrimental for the application of 'learning' approaches in the form known from western economies. Qualitatively well organized and distributed system macrostructures represent one of implicit presumptions of the theory of learning regions in advanced economies.

11.4 Conclusion

The chapter showed that the evolution of regional development conceptions is considerably dependent on institutional rule expressible as 'history does matter'. Neo-endogenous concepts that are currently in fashion are applicable namely in advanced western economies that underwent continuous socioeconomic development. However, this does not apply to Central East European economies suffering from developmental discontinuities and

deformed system macrostructures. Unfortunately, regional as well as other policies in transition economies typically omit these facts. Hence, transition economies stay vis-à-vis the great challenge concerning the formation of non-copied, tailored approaches to the regional development. Creation of adequate system macrostructures that comply with settlement system represents the first step on this enormously complex and long road.

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Contributors

Jiří Kern	VŠB – Technical University of Ostrava, Czech Republic
Jan Malinovský	VŠB – Technical University of Ostrava, Czech Republic
Jan Sucháček	VŠB – Technical University of Ostrava, Czech Republic
Marina van Geenhuizen	Delft University of Technology, The Netherlands
Peter Nijkamp	Free University of Amsterdam, The Netherlands
Lumír Kulhánek	Silesian University, School of Business Administration in Karviná, Czech Republic
Andrzej Klasik	University of Economics in Katowice, Poland
Florian Kuźnik	University of Economics in Katowice, Poland
Leon A.G. Oerlemans	Tilburg University, The Netherlands
Marius T.H. Meeus	University of Utrecht, The Netherlands
Frans W.M. Boekema	Tilburg University, The Netherlands
Grzegorz Micek	Institute of Geography and Spatial Management, Jagiellonian University, Poland
Vladimír Vavrečka	Enterprise plc Co., Ostrava, Czech Republic
Oto Hudec	Technical University of Košice, Slovakia
Gabriela Kolářková	Technical University of Košice, Slovakia
Piet H. Pellenbarg	University of Groningen, The Netherlands
Zdeněk Fischer	Labour Market Institute in Ostrava, Czech Republic

Autor:	Jiří Kern, Jan Malinovský, Jan Sucháček a kol.	
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