Role of Universities in the Regional Development (RURD)

Training Kit

Based on materials provided by EU project partners

Caucasus University

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Overview

This guide is intended to help the Managing Authorities of ERDF Operational Programmes improve the contribution of universities to regional development, with a view to strengthening the economic, social and territorial cohesion, in a sustainable way. While the primary target users of the guide are the Managing Authorities, it is expected that Regional Authorities and other bodies engaged with local and regional development will also find it of value.

It is anticipated that this Guide will be one of the resources in the European Commission's 'Smart Specialisation Strategies' (or 'S^3') Platform, the establishment which was announced in the communication "Regional policy contributing to smart growth in Europe 2020". Its primary objective is to provide assistance to managing authorities in Member States and regions on how to optimise the impact of regional funding allocated to innovation.

The guide bridges three knowledge and policy domains – education, research and innovation - the so called knowledge triangle (as described in Innovation Union[1] [COM(2010)546]. Public authorities seeking to mobilise universities[2] in support of regional development need some knowledge of all three domains, in particular national and regional policy makers involved in designing and delivering innovation strategies for smart specialisation as well as Managing Authorities designated by the Member States for implementing the Operational Programmes of the Cohesion Policy[3]. The guide provides an introduction into these worlds but can only scratch the surface.

The guide seeks to:

- provide an analysis of how universities can impact upon regions and how they can be mobilised for regional economic, social and cultural development.
- illustrate (by use of examples from around the EU) some of the potential delivery mechanisms that can be used to maximize the contribution of universities to regional growth
- outline the key success factors in building university/regional partnership, particularly the drivers and barriers on both sides behind such partnership working and how these barriers may be overcome.
- position potential programmes and interventions within the framework for ERDF support

The scope of the work to produce this guide did not permit primary research methods to be deployed, and therefore the sources used to inform the content of the Guide are entirely secondary from articles and websites in the public domain which includes European Commission documents, documentary evidence from workshops, self evaluations and peer reviews. Learning from the following programmes was especially drawn upon; Reviews of Higher Education in City and Regional Development (OECD)[4]; European Drivers for a Regional Innovation Platform (European Centre for the Strategic Management of Universities (ESMU) for EU Lifelong Learning Programme)[5]; and Sharing Innovative Practices in University Management - Collaborative Research (European Universities Association (EUA) for DG Research)[6].

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[1] http://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf#view=fit&pagemode=none

[2] This document defines the term "universities" as all higher education institutions, irrespective of their name and status in the Member States in line with the definition given in Delivering on the modernisation agenda for universities: education, research and innovation [COM(2006) 208]

[3] For more about Regional Policy Programme http://ec.europa.eu/regional_policy/index_en.cfm

[4] http://www.oecd.org/document/16/0,3746,en_2649_35961291_34406608_1_1_1_1,00.html

[5] http://www.eu-drivers.eu

[6] http://www.eua.be/euima

Context

Considerable effort has been devoted to the preparation of regional innovation strategies in which universities (as distinct from R&D organisations) are seldom mentioned – the focus has been on just one side of the triangle. While universities undertake research and can contribute to its development the guide situates this activity in the context of the other functions of the university, particularly teaching.

Furthermore the dominant paradigm has been one of a technology push, which has largely ignored the potential contribution of the Arts, Humanities and Social Sciences to regional development and innovation. Even the terminology and infrastructure of innovation has had a strong bias towards an assumption of a scientific or technological basis (e.g. many universities have "technology transfer offices"). Many of the examples used to illustrate points in this guide will reflect this dominant approach. However policy makers should consider how this might be challenged going forwards, and seek to embed the non traditional players in the innovation process in future programmes.

Universities in the round have potentially a pivotal role to play in the social and economic development of their regions. They are a critical 'asset' of the region; even more so in less favoured regions where the private sector may be weak or relatively small, with low levels of research and development activity. Successful mobilisation of the resources of the university can have a disproportionately positive effect on their regional economies and achievement of comprehensive regional strategies.

In order to effectively engage universities, public authorities need to understand the **principles** underlying why universities can be important agents in regional development. There is also a range of **mechanisms** available to support engagement, many of which are already being deployed. However it is the strategic coordination of these within a wider policy context that will produce the maximum impact.

It is important to recognise that there may well be a series of complex **barriers** and challenges to be overcome, both internal to the universities and in the wider enabling environment. If public authorities and the key regional partners understand the principles, practices and barriers and how to overcome them, the potential for maximising the contribution of universities is almost boundless. Achieving this is a long term objective and will require a staged approach moving from simple projects to more integrated collaborative programmes.

While this guide focuses on what the region can 'get' from its universities, it should be recognised that this is a two way process and the university benefits from its presence in the region as well. Universities should appreciate and maximise the potential of the opportunity that their region presents, not least as a 'living laboratory[7]' for their research.

[7] More information on 'living labs' in a European context can be found here - http://www.openlivinglabs.eu/

Key findings and recommendations

Mobilising universities needs to be addressed in a 'holistic' way and not just by focussing on transactional interventions such as consultancy services for local companies. It is tempting to focus on transactional mechanisms as they have clear outputs such as the number of firms assisted. However they are less likely to have the longer term outcomes and impacts that can be achieved with 'transformational' and more developmental programmes such as contributing through teaching to a regional human capital development programme linked to research based support to firms in a key regional business cluster.

It is recommended that there should be an active attempt to a shift from 'transactional' to 'transformational' interventions with a greater emphasis on programmes rather than one-off discrete projects.

Transformational and holistic programmes are far more difficult to develop as the outcomes are often unclear from the start, so it requires a very strong partnership with vision and courage to undertake their development. This can only be addressed by an inclusive, empowered partnership of key people with the appropriate leadership skills.

It is recommended that a partnership is established in the region to specifically address the issues of engagement between universities and regions and particular attention is given to ensuring the sustainability of partnerships in the longer term, independently of funding cycles.

Investment in people development within the university and its regional partners will be critical, as the kinds of skills needed to undertake these transformational programmes are often in short supply, especially in less favoured regions. Leadership and boundary spanning skills are essential, as well as capacity to critically assess progress (both internally through self evaluation and externally through expert peer review processes).

It is recommended that Managing Authorities should assign funds from their technical assistance budgets to support this and universities, business communities and other public sector authorities should match this to demonstrate their commitment to the process by investing in their own development.

The work of the OECD in its Reviews of Higher Education in City and Regional Development, the EU-Drivers for a Regional Innovation Platform (European Centre the Strategic Management of Universities(ESMU) for DG Education and Culture) and the EUIMA Programme (European Universities Association (EUA) for DG Research) on Sharing Innovative Practices in University Management - Collaborative Research provide important guidance to this process, and it is interesting that many of the regions highlighted in this Guide have actively participated in one or both of these programmes.

It is recommended that Regional Partnerships consider participating in the OECD programme of regional reviews in order to help identify their current strengths and areas that may require capacity building and consider carefully the findings of EUA and ESMU programmes.

European funding programmes are often not seen as attractive to universities, who may have access to other sources of funding for their research activities which have higher intervention rates and/or seek outputs that are in tune with standard academic principles and practices. Furthermore the processes for costing overheads and academic time can be perceived as overly bureaucratic and complex, requiring the university to have specialist staff to manage applications and projects to ensure compliance with regulations.

It is recommended that some simplification and flexibility in implementing Cohesion Policy Regulations is considered and that Managing Authorities are actively encouraged to adopt a more flexible approach.

The approaches focused on in this guide to illustrate the principles within it are primarily drawn from existing mechanisms currently being deployed, and therefore there is a bias towards a linear, science driven and technology 'push' approach to innovation. However, there is a need for social and service as well as technological innovation, especially in addressing the Grand Challenges such as climate and demographic change which have regional as well as global dimensions and attempting to respond to the Lund Declaration[8].

It is recommended that Managing Authorities and Universities adopt a broader definition of innovation to acknowledge the role that arts, humanities and social sciences can play, especially in responding to the 'Grand Challenges[9]' and develop mechanisms that draw on the expertise and contribution from these disciplines to issues like regional entrepreneurship, creativity and social inclusion which form key dimensions to territorial development in the round.

[8] http://www.se2009.eu/polopoly_fs/1.8460!menu/standard/file/lund_declaration_final_version_9_july.pdf
[9] Defined in the Lund Declaration as "areas such as global warming, tightening supplies of energy, water and food, ageing societies, public health, pandemics and security."

SECTION 1 UNDERSTANDING THE ROLE OF UNIVERSITIES IN REGIONAL DEVELOPMENT

1.1 Tapping into the knowledge base about the role of universities in regional

There is a growing body of theory and practice about the role of universities in regional development. This has been summarised by OECD in its 2007 report Higher Education in Regions: Globally Competitive, Locally Engaged[10]. This has identified why regional authorities across the OECD countries are seeking to mobilise universities in support of their regional development strategies and why, for their part, many universities are engaging with the development of their regions (the drivers). A key message from OECD is that successful partnerships depend on both universities and regional authorities understanding each other's drivers. Too often partnerships fail because university managers do not understand the challenges of regional development and regional authorities do not understand the core mission of universities and the constraints within which they work. However, once mutual understanding is reached it is possible to put in place structures and procedures which overcome the barriers to collaboration. This mutual understanding can come from appreciation of some of the general principles as to *why* the universities in a region have the potential to contribute to its development and from case studies about *how* those principles have been translated into practice. Understanding principles as well as practice is important as it reveals that while there are some universal mechanisms that can be adopted across the whole of the EU in this area – what is actually effective is highly contingent on regional and national circumstances, including the region's industrial structure and governance, and how universities are funded and regulated within their national higher education system.

1.2 Why universities are important for regional development

At the most basic level, universities can be anchor institutions in local economies as major employers across a wide range of occupations, purchasers of local goods and services, and contributors to cultural life and the built environment of towns and cities. Regional investment in the infrastructure of a university to support its core business of research and teaching can therefore have a significant *passive* regional multiplier effect even if the university is not *actively* supporting regional development.

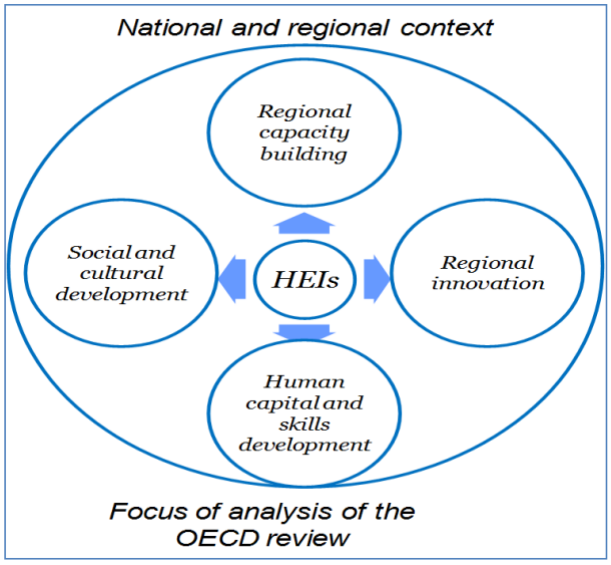

Figure 1.1 OCED analysis framework

But what of the more active contributions that universities can make? This can be broken down into four areas – business innovation which is closely linked, although not exclusively, to the research function of the university, human capital development linked to the teaching function and community development linked to the public service role of universities. The fourth area is the contribution of the university to the institutional capacity of the region through engagement of its management and members in local civil society. These are the four areas covered in the OECD reviews of the universities and regions (Figure 1.1, HEIs acronym used for "universities"). Where these four domains are integrated, the university can be seen to be occupying a "proactive" and not just "passive" role in the regional development process.

[10] http://www.oecd.org/dataoecd/51/27/39378517.pdf

1.3 Universities and regional innovation

The main focus on promoting the active engagement of universities in regions has been in terms of their contribution to Regional Innovation Systems (RIS). This has gained a new salience in the context of the advancement of the notion of regional "smart specialisation" as a future focus for European regional policy. According to McCann and Ortega-Argilés [11] smart specialisation *"envisages that the identification of the knowledge intensive areas for potential growth and development are related to the role of certain classes of players (researchers, suppliers, manufacturers and service providers, entrepreneurs, users) and the public research and industry science links. The players are regarded as being the agents who use the knowledge acquisition facilities and resources (human capital, ideas, academic and research collaborations) to scan the available local economic and market opportunities, to identify technological and market niches for exploitation, and thereby act as the catalyst for driving the emerging transformation of the economy"*. Universities can therefore play a key role in defining a regional smart specialisation strategy by contributing to a rigorous assessment of the region's knowledge assets, capabilities and competencies, including those embedded in the university's own departments as well as local businesses.

Historically public support for universities engaged in regional development has followed the US experience of Silicon Valley in focussing on high-tech knowledge areas like IT and bio-technology and fostering spin outs of businesses from research labs using science parks as a key mechanism. However, such initiatives often fail to recognise the time and place specific nature of the US experience making it difficult to transfer to long established European industrial or agricultural regions. In contrast the smart specialisation approach recognises the opportunities for technological diversification strategies of major locally embedded industries to which the university research base can contribute. This is not to deny the role of university spin outs adding to the body of entrepreneurial activity in the region and the attraction/retention of global businesses by the assets (physical and human) that the university has to offer.

1.4 Human capital and skills

Universities can act as a powerful magnet for attracting talented students and staff into the region from other parts of the country and even further afield. In addition, through their teaching at undergraduate and postgraduate level, universities have the potential to add to the stock of human capital by means of graduate recruitment into regional businesses, possibly following work placements as part of the student's degree. More particularly, graduates can provide the gateway or connectivity through which knowledge exchange between researchers and businesses takes place. But all too often teaching programmes respond solely to student demand and a national labour market for graduates particularly when there is no clearly articulated business demand linked to regional innovation drivers. The consequence is often graduate emigration to more dynamic regions.

1.5 Social and economic development

It goes without saying that regional development is about social as well as economic cohesion within as well as between regions. Universities can play a key role in this domain through access programmes designed to widen local participation in higher education. In the process they can increase the supply of skilled labour as local recruits are more likely to remain within the region compared with those joining the university from elsewhere. Also as businesses undergo technological transformations current workers can upgrade their skills through university lifelong learning programmes. Last but not least a region's population can be a "living lab" for researchers in the universities and business to identify new market opportunities and evaluate service as well as product innovation. Nowhere is this truer than in

[11] Philip McCann and Raquel Ortega-Argilés **(**2010). Smart Specialisation, Regional Growth and Applications to EU Cohesion Policy.

relation to those innovations relevant to sustainable development. In this domain as elsewhere academic interventions need to embrace the social as well as the technological.

1.6 The university drivers

There are many factors driving universities to engage with their regions. In terms of student recruitment, declining public funding for students is meaning more will have to be recruited locally. This may involve developing links with schools especially in relation to areas like science where there is often a shortage of good applicants. Demonstrating the local availability of science-based jobs is often important for such campaigns. In the national and international marketplace for students (and also academic staff) the need to promote and contribute through its campus to the attraction of the town or city as a place to live, work and study is a key driver for the universities. This may involve fostering the local creative economy. Finally, at the graduation stage, universities are often judged by the employment record of their students. Here work placements with local companies may increase the labour market prospects of the student.

In terms of research, science and technology policy at both a European and a national level is increasingly emphasising the importance of collaborative research between universities and the public and private sectors. So just as there are regional drivers for business to "reach in" to the universities, so there are drivers within universities to "reach out" to business. And because of the importance of face to face contact within such collaborations there is a strong case to be made for these links to be at a local level.

In the societal sphere regional engagement is an obvious arena in which universities can demonstrate their contribution to the public good – through such programmes as public lectures, concerts, museums, theatres, student community action and recruitment of students from disadvantaged social groups.]

1.7 Building regional capacity

The preceding discussion has highlighted the potential contribution of universities to regional development. Realising this potential is another matter as there are many barriers in the way. On the university supply side, higher education policy in most member states is "spatially blind" as is most research and innovation policy. Academics and their universities are rewarded on the basis of the scientific excellence of their research and where they collaborate with business there are strong incentives for this to be with leading companies in the field regardless of their location. While university technology transfer offices are dedicated to the commercialisation of research, including spin outs, they are generally not resourced to support regional development where the outcomes such as job generation may be outside the domain of higher education. The consequence of all of this is that the national and international rankings of universities are by and large correlated with the hierarchy of regions.

On the teaching front student places are allocated on the basis of national rather than regional needs. While some countries have binary systems of higher education embracing universities and polytechnics, with the latter being more regionally embedded, the incentives for collaboration across the binary divide are limited. Last but not least university leaders may not have the authority because of national legislation around the governance of these institutions to mobilise resources to meet regional development needs.

On the regional demand side while a region might possess a strong university or universities there might be limited absorptive capacity in local enterprises, especially SMEs or the branches of multinational companies with no local in-house R&D. On the institutional side local governments may be fragmented and unable to act beyond their immediate boundaries. The entrepreneurial environment, including venture capital funding, may be inimical to university spin outs. In such circumstances the bundling together of demand for university services will be challenging.

Notwithstanding these barriers, and as the Barca Report[12] makes clear, the implementation of effective regional development strategies requires "the explicit spatial targeting of bundles of public goods tailored to the local context and specifically designed to foster local development by encouraging the maximum engagement of all stakeholders and parties in local development issues". Universities working with regional authorities have the potential to move from being located in regions to being part of regions through contributions to the design and implementation of smart specialisation strategies in a local learning and capacity building process.

Universities can play a key role in helping public authorities build these strategies by enhancing the skills and competencies of their staff working in the field of economic development through consultancy services and training of graduates. This would involve university departments of economics, geography, planning, public administration and business management as well as those dealing with specific policy areas such as health, agriculture, environment and culture. A dedicated unit may be necessary to bring these academic skills together.

The OECD[13] has established a mechanism for kick-starting such a learning process by means of a self-evaluation by universities and their regional partners of how well they are working together across all four of the domains discussed here. The self-evaluation is overseen by a partnership board and then the subject of an external peer review designed to assist the partnership with its future development, including moving from a project by project approach to a programme in which universities are major players in shaping the region's development. A variant of this model could be adopted by European regions seeking to work more closely with their universities as key players in taking forward a regional strategy for smart specialisation (RIS3). The leadership role of the universities in this process might be recognised by the incorporation of university leaders into a high level Regional Knowledge Leadership Group responsible for the design and delivery of the strategy. Under this umbrella the region may wish to establish partnership sub-groups dealing with specific areas such as higher education itself, information society and sustainable development with each group recognising that universities can contribute to all of these knowledge domains.

[12] Fabrizio Barca (2009). An Agenda for a Reformed Cohesion Policy
[13] http://www.oecd.org/edu/imhe/regionaldevelopment

1.8 The mechanisms by which universities can and do contribute to regional development

As highlighted earlier, there are a range of ways in which universities can and do contribute to regional development and smart specialisation. However within each of these roles there are a range of mechanisms which can be employed, either as individual projects or collectively as part of a wider programme or strategy to support a regional development agenda.

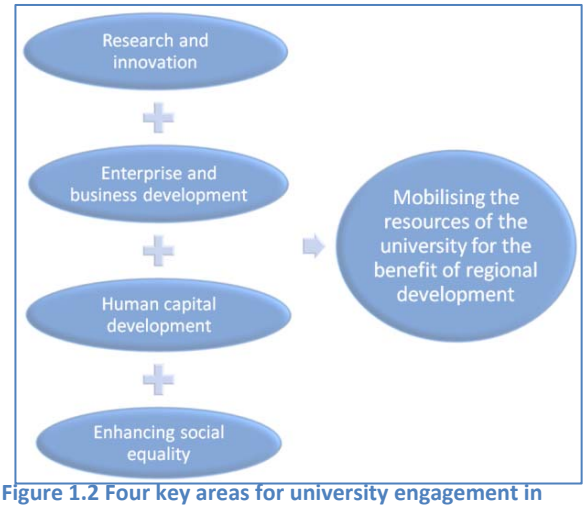

Figure 1.2 Four key areas for university engagement in regional development

The following sections explore each of these under the four key areas through which universities most commonly engage in regional development (as depicted in figure 1.2);

- Enhancing regional innovation through their research activities
- Promoting enterprise, business development and growth
- Contributing to the development of regional human capital and skills
- Improving social equality through regeneration and cultural development

In reviewing these mechanisms it is important to make a distinction between the regional impact of 'normal' university activity financed as part of the core business of teaching and research and purposive regional interventions initially funded from a source outside higher education and then hopefully 'mainstreamed'. As summarised in the table below Individual mechanisms can vary in their complexity. At one end of the spectrum are fairly straightforward 'transactional' services in response to a stated need or demand; at the other end of the spectrum are more developmental or transformational activities which recognise latent or unstated needs.

	'Transactional' services	Transformational activities
Type of need / demand	stated need or demand	latent or unstated needs
Type of approach	*output* driven approach	*outcome* driven approach
Type of objectives	clear objectives	less explicit objectives
Link to time	usually time bound	less clear timelines

Table 1.3 Transactional vs. Transformational Interventions

In considering these interventions it is important to recognise the challenge of appropriate indicators to measure their regional impact. Certain types of intervention may be preferred simply because it is relatively easy to count the **outputs** such as patents registered or new business spun out as a result of university research as compared with interventions that support capacity to build long term **outcomes** and which are more difficult to measure. Indeed, because there may be a national correlation between for example public inputs into research and outputs in terms of the licensing of new products, this does not necessarily mean that mechanisms have to be put in place at the regional level to expedite these

outputs. Investment to achieve longer term capacity to realise innovation outcomes through collaboration between universities and business may be more appropriate.

With these caveats in mind the following sections will draw on case studies of interventions from around Europe, some of which have been funded from EU support instruments, including Framework 6 and 7 programmes and Structural Funds of the Cohesion Policy (ERDF and ESF). All of these are concerned with promoting research, innovation, competitiveness, human capital or improved mobility. As these examples and 'case studies' can only provide a small taste of the complexity of the interventions being described, links to further information is provided where possible. The interventions are classified according to their potential to transform regional economies and the complexity of effort required for their implementation. Each group of interventions is introduced followed by a set of tables describing individual mechanisms, their potential impact on regional development and the challenges that may be faced in implementation and are illustrated by a brief example.

While this document seeks to provide some guidance on why and how universities can be more connected to regional growth through engagement with EU competitiveness and cohesion programmes, it is also important to recognise that there are issues in the policies and guidelines governing these funding instruments that may act as additional barriers to engagement and involvement of universities in regional development.

Feedback from both universities and managing authorities suggests that universities can be reluctant to commit to involvement in EU funded projects because of a perceived risk to the institution of 'claw back'. In particular Article 55 of the regulations (i.e. that any revenue generated from the investment has to be deducted from the overall budget) can act as a serious disincentive for universities from undertaking the more transformational and complex activities where the outcomes are less clear.

Furthermore, there is concern about the processes for costing overheads and academic time which are perceived as overly bureaucratic and complex, requiring the university to have specialist staff to manage applications and projects to ensure compliance with regulations. For some universities, particularly those who can more easily access funding elsewhere for their research activities, it is sometimes seen as simply 'not worth the bother', particularly when intervention rates are capped at 50%.

Managing authorities who wish to connect their universities more firmly in the regional development process, and particularly enhancing their contribution to regional innovation strategies for smart specialisation, could require some simplification and some flexibility in implementing Cohesion Policy Regulations. In the framework of the last years of the current programming period and of the future programming period, these issues are being and will be discussed in a partnership process involving the Commission and the relevant authorities in the Member States. Universities should also seek to contribute actively to this process.

SECTION 2 ENHANCING REGIONAL INNOVATION THROUGH RESEARCH ACTIVITIES

2.1 Introduction

Research and development activities play a key role in regional development by providing the knowledge base that can underpin innovation. One of the most important ways in which a university can contribute to its region is through the 'translation' of its research (and that of others) into a form that can be taken up by regional actors in the private and public sector. The word 'translation' is associated with what is sometimes referred to as the 'assisted linear model' of innovation that starts with research. However it is important in designing interventions to recognise that university research can be drawn into the regional innovation process by demand from the regional public and private sectors for expertise relevant to business and household activities. It is in this area that the skills of business schools and the social sciences and humanities can be mobilised – for example in relation to organisational innovation, social innovation and the public policy environment within which regional actors operate. In short the contribution of university research to regional innovation has to be seen as multi-disciplinary and iterative as well as linear.

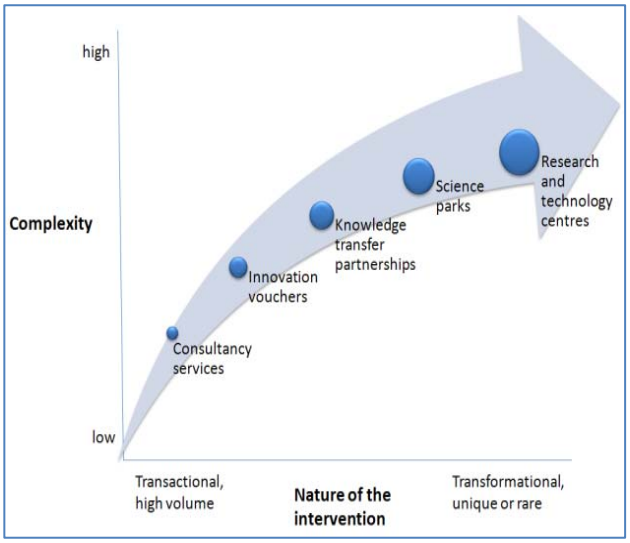

Figure 2.1 Enhancing regional innovation through research activities

Figure 2.1 suggests a range of mechanisms through which the translation process can take place ranging from the most simple such as the provision of consultancy services through to more complex links with nationally strategic research centres.

Starting with consultancy services and innovation vouchers, these are about unlocking the knowledge and expertise of the university for the benefit of local businesses. Consultancy services are usually delivered in response to a request from a business to support it with a specific project. The service will be delivered against a clear terms of reference and will be time bound with clear milestones and deadlines. Innovation vouchers are a bit more complex as they are geared towards stimulating demand for university research rather than a response to existing demand. Innovation vouchers support SMEs to purchase services for which the outcomes and process will be less clear. This can range from addressing problems in the business operations to helping unlock innovations in products or services. There have been a number of reviews of voucher schemes within the EU and beyond which can help in building a deeper understanding of this mechanism, such as the report Availability and Focus on Innovation Voucher Schemes in European Regions[14] from DG ENTR.

[14] http://www.europe-innova.org/c/document_library/get_file?folderId=122731&name=DLFE-6403.pdf

Knowledge transfer partnerships (KTPs) are about encouraging the mobility of human capital between the university and local businesses. Post graduate (often post doctoral) staff from the university work on relatively long term research projects (usually 1-3 years) within a local company and are overseen by commercial and academic supervisors. As well as the obvious benefits of diffusing research into commercial arenas, KTPs are also important tools in developing 'boundary spanning' skills among the people involved in the project which leads to improved relationships between the university and local companies and creates greater opportunities for future collaborations. Because of the reliance on human capital and 'soft skills' in the success of KTPs it is seen as a relatively complex but potentially transformational activity for the beneficiaries.

Science Parks and Research and Technology Centres require significant capital investment, but it is what takes place within them that has the potential to have a transformational impact. Science parks are generally established to house new and existing businesses in a 'hub', often with strong links to research centres and universities. They are aimed at supporting the exploitation of research that has already proven to have commercial applications. In contrast, Research and Technology Centres generally support technologies at a much earlier stage in development or technological 'readiness'. They provide a focus for the downstream investment in new technologies emerging from the research base in universities in order to bring them closer to market commercialisation and bridge the gap between research and its application as illustrated in Figure 2.2. Universities are therefore more likely to be involved in the activities of research and technology centres than science parks. There will tend to be a high level of public investment in the activities in such centres as they are seen as important players in supporting the development of national innovation and competitiveness and **may** also be assigned a regional role. It is worth noting The Smart Guide to Innovation-Based Incubators (IBI) published by DG REGIO in February 2010 as a useful supporting document in this area[15].

In addition, the Europe 2020 strategy[16] clearly signalled the importance of industrial competitiveness for growth and jobs as well as for Europe's ability to address grand societal challenges in the coming years. Mastering and deploying Key Enabling Technologies (KETs) in the European Union is central to strengthening Europe's capacity for industrial innovation and the development of new products and services needed to deliver smart, sustainable and inclusive European growth. The Final Report of the High Level Expert Group on KETs[17] is a useful source of further information.

From this brief description it will be seen that these intervention types vary in their depth, complexity and the time it takes to establish and maintain them, and so it may be necessary for the region to think in terms of an evolutionary process building towards the transformational change.

When designing interventions it also needs to be recognised that the regional innovation systems is not a closed one, but operates in a wider national and even international context. So as well as promoting a bottom up process of developing partnerships and building relationships, it is also important to be aware of the top down, strategic influence of national and regional innovation policy.

[15] http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/innovation_incubator.pdf
[16] http://ec.europa.eu/europe2020/index_en.htm
[17] http://ec.europa.eu/enterprise/sectors/ict/files/kets/hlg_kets_report_en.pdf

Technology readiness

When considering research and innovation related activities it is important to consider the stages between basic research and 'market ready' products and services and recognise the danger of a 'missing link' between the two stages, where activities are too far from basic research to interest universities and too far from market to interest private companies (see Figure 2.2 below). This innovation chain will be sector specific and it is therefore important to understand the nature of each of the stages in relation to the industrial development policies of the region in order to determine where public investments might be needed.

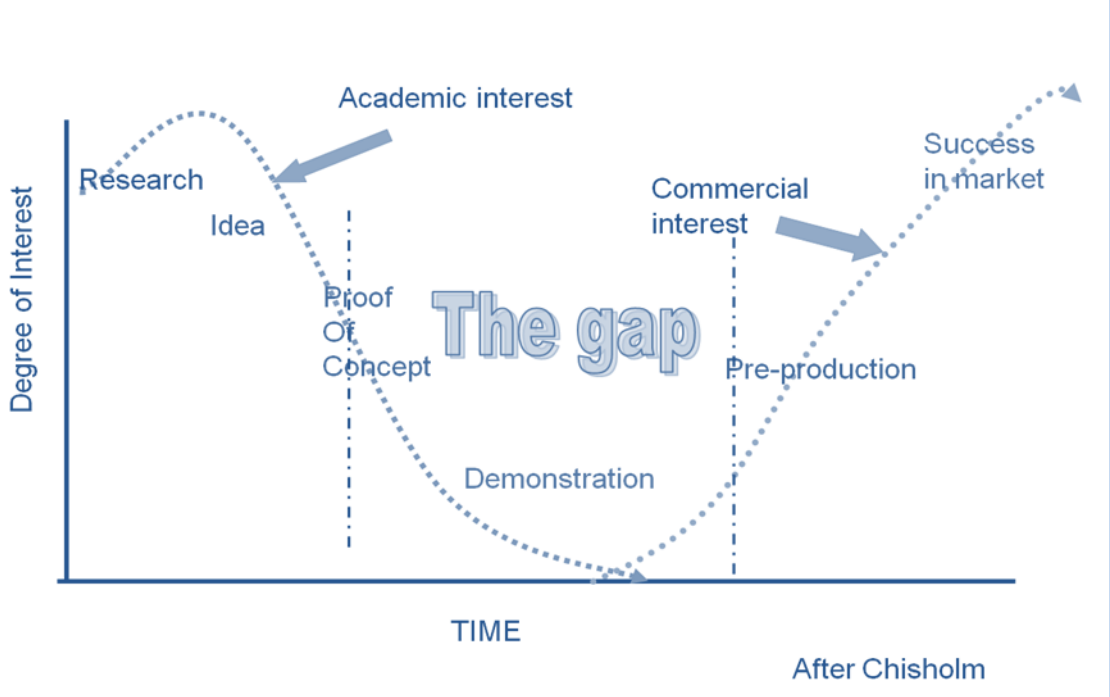

Figure 2.2 Technology readiness

One approach to analysing this chain is presented in a Communication from the Commission (coordinated by DG Information Society) Pre-commercial Procurement: Driving Innovation to Ensure High Quality Public Services in Europe[18]. Public procurements, including at pre-commercial stages, are highlighted in the EU 2020 strategy and related documents as instruments to be promoted in the framework of innovation systems.

[18] http://ec.europa.eu/information_society/tl/research/priv_invest/pcp/documents/pcp_brochure_en.pdf

2.2 Consultancy Services

Description

This is one of the most straightforward ways of encouraging business-university interactions. Universities will often have some kind of 'business engagement' office or centre, where businesses can request specialist support in overcoming what is usually an immediate problem which requires a short term solution. Projects are usually time bound, contract driven and with clear milestones, targets and costs. Regional, national or European funding mechanisms can be employed to subsidize the cost of the intervention.

Potential impacts for regional development

It enables businesses to access the vast knowledge resources of the university and also helps to embed university expertise within the private sector, thus demonstrating impact of their research. Businesses that engage with universities are more likely to be innovative and growth oriented and therefore have the potential to make a greater contribution to their local and regional economy.

Issues and challenges

Many businesses find it difficult to identify access points and route ways in to universities. Universities need to not only proactively promote their services to local businesses but also ensure that there are clear contact and entry points.

There is often a clash of cultures between the academic and private sectors, with businesses motivated by immediate solutions and returns in the short term, while university staff may be more motivated by longer term research outputs. Clear terms of reference must be established to ensure that expectations are shared and realistic.

Providing consultancy services is predicated on the assumption that businesses already know exactly what it is they need to overcome their problems and/or grow. In many cases (especially in lagging regions) there may be a lack of capacity within SMEs to effectively diagnose their own needs and identify possible solutions.

Case study

Active Technology Transfer, Steiermark Region, Austria

The Steiermark region piloted a project in which SMEs not usually targeted by innovation policies were offered consultancy and technology transfer. Four partners, three universities and a private research body, worked together for this project, establishing a consortium to implement the project. Following the piloting of the project, a successor project, Technofit Pro, was implemented by the same partnership with similar objectives building on the experience gained under the ATT project. This successor project is co-financed under the mainstream Objective 2 programme of the region and is expected to be followed up again in the Steiermark Regional Employment and Competitiveness Operational Programme for 2007-2013.

http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/goodpractice/1knowledge/2links/at_att.pdf

2.3 Innovation Vouchers

Description

Innovation Vouchers enable small and medium-sized businesses to buy specialist support from knowledge-based institutions. They differ from consultancy services as they are aimed at helping the development of new products, services and processes rather than solving existing problems in the business. In order to stimulate demand they are often heavily subsidised.

Potential impacts for regional development

This is a more complex area than simply responding to a request for services as in the case of a consultancy relationship. Encouraging businesses to engage in innovation will be for many a step into the unknown. However we know from a range of measures and analysis tools that regions where there are high levels of innovation among businesses they are more likely to be successful than others. Universities with their research orientation and curiosity driven cultures have a large role to play in fostering innovation in their regions.

Issues and challenges

For many businesses, particularly SMEs, coping with day to day operations takes up all of their time. Innovation can be seen as an esoteric concept and something of a 'luxury' when there are pressing commercial decisions to be made. Businesses often focus on the 'here and now', while investing in innovation is not only relatively expensive but can be very long term in its outlook.

University researchers may be focused more on academic outputs (e.g. publications, case studies etc.) and fail to 'sell' the benefits of engaging in innovation and research to businesses. Sometimes even the different language and terminology can be off putting.

Innovation fosters innovation. While there may be effective engagement between universities and businesses it is often the businesses with a track record of engagement with the university that come forwards. The challenge is how to promote innovation to the businesses that are least engaged (and therefore need it the most).

Case study

University of Tartu Institute of Technology, Tartu County, Estonia

The Innovation Voucher Grant programme that opened in February 2010 is the simplest way for enterprises to launch co-operation with research institutions for the purpose of implementing innovative ideas. Estonia's small enterprises have received innovation vouchers from Enterprise Estonia for implementing 149 innovation projects. The total volume of grants financed from the European Regional Development Fund is now close to €600,000. Innovation vouchers have been used to implement a large variety of innovations. In addition, many of the projects focus on energy efficiency and on being environmentally-friendly.

http://hei.eas.ee/index.php?option=com_content&view=article&id=636:enterprise-estonia-gave-innovation-vouchers-for-149-small-enterprises-last-year-&catid=41:news

2.4 Knowledge Transfer Partnerships

Description

Knowledge Transfer Partnerships (KTPs) are a tool primarily employed in the UK, where they have attracted significant national government investment. KTPs enable businesses with a strategic need to access a University's expertise and knowledge to improve their competitiveness, productivity and performance. The scheme involves a high calibre graduate (KTP Associate) working in a company with academic supervision. This often results in strategic advantages for the company; academic benefits to the University and valuable industrial experience to the Associate. Depending on the needs of the organisation and the desired outcomes, KTPs can vary in length from one to three years.

Potential impacts for regional development

KTPs are an important tool in disseminating research from universities into local businesses and communities. These ensure that maximum 'value' from the investment in research is embedded in the region. Researchers who are not subject to the day to day commercial pressures of running the business can be highly skilled in helping to identify and overcome endemic problems. Also universities may be working with a number of businesses in the same industry, so can diffuse learning between them. University researchers may be operating in a much broader geographic sphere than SMEs and therefore can bring global experience and expertise to help address local issues.

Issues and challenges

Universities, especially those with worldwide reputations for research excellence in a particular industry or technology will be in demand by the leading businesses regardless of their location. It is therefore a dilemma of less favoured regions that their universities may be supporting business in more favoured regions, which have the capacity to demand and work with their researchers, to the detriment of business and economies in their own region. The huge challenge is how to increase the absorptive capacity within SMEs in less favoured regions for university research?

Case study

Instituto de Tecnología Cerámica (ITC), *Valencia, Spain*

ITC is a mixed Institute created by agreement between the Ceramic Industry Research Association (AICE) and Universitat Jaume I (UJI) of Castellón. It was established in 1969 in response to the needs and demands of companies from the Spanish ceramic cluster and has, over the years, articulated a university–business cooperation system that has contributed significantly to the notable development of the Spanish ceramic tile manufacturing industry.
ITC has played a key role in this development by positioning itself as a business partner in the Spanish ceramic cluster network, a network mainly comprising SMEs, to generate the technology that, obtained either from undertaking the necessary R&D actions or transferred from other branches to the ceramic sector, is capable of providing new, socially useful products at competitive prices. ITC has successfully bid for FP and CIP funding to support its activities

http://www.itc.uji.es/Paginas/default.aspx

2.5 Science and Technology Parks

Description

Science and technology parks are locations (physical or even virtual) that are established to provide a 'hub' for related business in a particular industry or sector. Features can include specialist management, incubation and business support, links to university and other research centres, shared resources and equipment and 'soft' support such as mentoring, networking, business counselling and so on. Supported through a variety of local, regional, national and European Union funds, the structure of science parks can vary and there is no common formula for ownership. Universities, local authorities, private companies and property developers can all be involved in different ways and to different levels.

Potential impacts for regional development

Science parks usually have formal and operational links with centres of knowledge creation, such as universities, and create a mechanism to commercially exploit research being carried out there. Science parks are often built around an industry specialism that a region or area is trying to develop or exploit, and as such can act as a showcase for the region in marketing itself and attracting inward investment. The underlying theory behind Science parks is that there will be agglomeration affects from collocating research intensive businesses that will benefit the wider economy.

Issues and challenges

Several detailed studies into the long term impacts of science parks have found that their success is to a large degree determined by the economic conditions of the wider region, and therefore are less likely to benefit regions with less favourable circumstances.

There is a real danger that constraints on public spending and the push to privatise public projects means that science parks may default to become just commercial business parks, losing the link between research and business and the developmental activities that are an integral part of the model.

Case study

Potsdam University, Brandenburg, Germany

Since the mid-1990s, the Science Park at Golm on the outskirts of Potsdam has developed into the largest and most important science and research centre in Brandenburg. Originally the site of Potsdam University, Golm now hosts three Max Planck Institutes, two Fraunhofer Gesellschaft Institutes, a business incubation centre (GO:IN) and many innovative enterprises. More than 1,300 scientists are working at the science park and the various university institutes have a total of 7.000 students. Many joint research projects have been funded under FP5, 6 and 7.

ERDF contribution to the development of the Science Park was EUR 74.3 million

http://www.wisspark.de/

2.6 Research and Technology Centres

Description

Research and Technology Centres create a critical mass for business and research innovation by focusing on a specific technology where there is a potentially large global market and a significant national capability. They provide a 'translational infrastructure' to provide a business-focused capacity and capability that bridges research and technology commercialisation. They are generally focused on the exploitation of new technologies, through both established technology areas and in new, emerging technologies. Models across Europe include Technology Innovation Centres (TICs) in the UK, the Fraunhofer Gesellschaft in Germany and TNO in the Netherlands.

Potential impacts for regional development

These centres are an important part of the innovation system, with potential to make a major long-term contribution to economic growth. They allow businesses to access equipment and expertise that would otherwise be out of reach, as well as conducting their own in-house R&D. They also help businesses access new funding streams and point them towards the potential of emerging technologies.

Issues and challenges

In order to succeed, these centres need to be integrated within a national innovation system and strategy which pays appropriate attention to business requirements and the location of relevant expertise. There needs to be prioritisation and coordination at the national level, which may prove difficult to align with regional economic development strategies.

Regional and local policy makers will have to consider the impact and effect of national innovation strategies on their own development goals. One issue in particular is the impact of the presence of national innovation centres on the regional innovation system.

In an era of resource constraints difficult choices will have to be made about which locations would result in optimal impacts nationally. Recent studies suggest that the best use of public funding is when concentrated on a small number of elite, mission focused, national centres, and that funding needs to be sustained far beyond the normal 3-5 year cycle.

Case study

NanoFab, Venice, Italy

The mission of NanoFab is to transfer technological knowledge and results of industrial research to firms, especially local companies, which may benefit from the application of nanotechnologies. The projects expected impact is to contribute to foster structural change in the territory's productive fabric and allow the local economy to move towards knowledge-based production. NanoFab carries out, promotes and coordinates, research and technological activities through its own structures and in collaboration with universities and other public and private bodies. It provides a diverse range of high level technological services in response to specific and complex demands. It has been created with an investment of over €25.5m co-financed by the European Regional Development Fund (ERDF), the Italian Government, Veneto region and VEGA (the science and technology park of Venice).

http://ec.europa.eu/regional_policy/cooperation/interregional/ecochange/goodpractice/1knowledge/1cluster/it_nano.pdf

SECTION 3 PROMOTING ENTERPRISE, BUSINESS DEVELOPMENT AND GROWTH

3.1 Introduction

This section focuses on the ways in which universities can contribute to the business and entrepreneurial environment. This includes activities which help build a more entrepreneurial culture (especially among students and graduates), efforts to stimulate business start up among graduates and staff, and measures which help build a more favourable business environment for both new and existing firms.

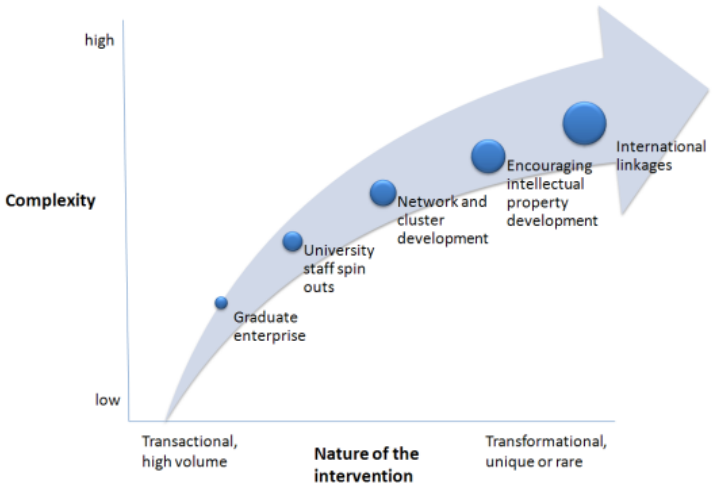

Figure 3.1 Promoting enterprise, business development and growth

Enterprise programmes aimed at students have a number of possible benefits for the region. In some cases the focus is on teaching students to be more 'enterprising', which is helping them to develop life skills that will make them more productive and innovative in their future careers, whether in an employed or self employed capacity. This is good for the region regardless of the sector in which they work. 'Intrapreneurs' (i.e. people who behave entrepreneurially within an organisation) are just as important for regional development as entrepreneurs.

As well as the case study of graduate enterprise activity highlighted in this section it is also worth noting additional examples which are presented in the DG REGIO brochure Regional Policy for Smart Growth in Europe 2020[19].

Many universities offer short term placements with local SMEs as part of their enterprise activities. This is beneficial in a number of ways, not least by giving students an insight into the workings of the SME which may result in them being more inclined to stay in the region and work in an SME rather than be attracted to large corporate firms (who may be located elsewhere), so this can help retain talent in the region. For the SMEs, they can benefit from someone bringing new skills, insights and approaches to the business (which might not have employed graduates normally) and also gain an important link back in to the university, which might make the business more likely to engage in the future. For the region more generally a new generation of 'boundary spanners' emerges – in other words, people who understand and can operate in both the academic, public sector and business worlds, and even across the triple interface of the sectors.

But in addition to promoting the development of entrepreneurial skills and providing students with an opportunity to try the entrepreneurial 'experience', universities often contribute to the development of the business base in the region by supporting staff and students to start a business. These are important contributions to the local economy as evidence shows a positive correlation between levels of academic

[19] http://ec.europa.eu/regional_policy/information/pdf/brochures/rfec/2011_smart_growth_en.pdf

achievement and the likelihood of starting a 'high growth' business. Furthermore academic 'spin outs' are an important mechanism for the diffusion of research and innovation into the local economy and of course ensuring that talent and intellectual property remains in the region.

Spin 'outs' versus spin 'offs'

The terms 'spin out' and 'spin off' are often used interchangeably, and sometimes different definitions are applied to the same term. For the purposes of this document the term 'spin out' is defined as a new entity formed by staff from a parent organisation (in this case, a university) which is based around some form of asset (technology, intellectual property) that was developed while staff were employed by the university. The spin out is entirely independent of the university financially and legally. However in some cases the university may take an equity stake in the company (for example, in return for releasing intellectual property) or there may be licensing agreements between the two organisations.

A 'spin off' on the other hand is defined here as a part of a business that is separated from the parent company in order to allow it to grow and develop more freely. While the spin off operates at 'arms length' from the parent company, (it may have new premises, staff, branding etc.) it is still essentially owned and controlled at source, and the parent company has a vested interest in its success.

Figure 3.2 Spin outs vs. spin offs

Universities are often well placed to observe the emergence of new clusters in a region through the networks they form when working with companies on research programmes (for example, in Framework programme activities). The University can therefore act as a catalyst or facilitator in the development of network and cluster organisations. These are particularly important as they can aggregate demand from a number of firms for innovation and thus strengthen the ties between university research activity and commercial exploitation. However universities can go beyond this by becoming committed players in clusters and promoting cooperation between clusters, from a European perspective of regional development. The report Assessment of the impact of the Regions of Knowledge' programme[20] carried out by Technopolis for the Commission (DG Research and Innovation) contains some very interesting case studies and analysis of the 'transformative' role that cluster development and cooperation can play in regional development terms.

By their presence in a region and through their research activities universities can also stimulate the development of intellectual property among businesses in the region as empirical evidence shows a positive correlation between numbers of people with higher education in a region and patent applications. Furthermore universities can play an important role in 'demystifying' intellectual property (IP) protection for companies through training and awareness raising. The European Patent Office (EPO), in cooperation with National Patent Offices (NPOs), promotes IP teaching in universities, the development of IP teaching tools and the partnership in IP related areas between universities and companies[21]. However, although the situation is improving, the promotion of technology transfer in

[20] http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/assessment_of_the_impact_of_the_regions_of_knowledge_programme.pdf
[21] http://www.epo.org/about-us/office/academy/areas/academia.html

Europe is, to a large extent, hindered by a lack of incentives in terms of regulations, financial support and intermediate organisations. The situation is different in the United States, where the expansion of technology transfer has been linked to rules ensuring full ownership by the universities of research results, which puts them truly at the heart of the innovation production process and gives them a genuine incentive to optimally implement their results (following the example of the Bayh-Dole Act, which is not the case in Europe).

Promoting technology transfer through intermediate organisations: a new tool in France

To speed up technology transfer from university poles in France, private associations are being set up called SATT (Sociétés d'Accélération du Transfert de Technologies). They will be in charge of gathering patents from universities and some research organisations and responsible for ensuring the interface between French public laboratories and industry. SATT will work for universities and research establishments with the following objectives: maturation of research; transforming scientific discoveries into applications; creating public-private research projects or accompanying the creation of start-ups. SATT should play a key role to enhance the business development of the universities.

http://www.gouvernement.fr/gouvernement/des-societes-de-transfert-de-technologies-au-coeur-des-universites

Many universities operate in an arena that reaches far beyond their regional or even national borders. This may be through attracting students from other regions and countries by the provision of high quality and specialised teaching programmes, and/or by working with other researchers (academic or private) around the world on collaborate research projects or as consultants. These internationally linked universities are a huge asset for their regions if these linkages can be harnessed for the benefit of the development of the region, either in attracting investment, linking local companies to international research excellence and expertise or attracting talented individuals to the region to work or study at the universities.

However the 'flip' side of this is that researchers tend to be spatially blind when it comes to their work – they want to collaborate with the best people and companies, wherever they are located. In regions where there is little R&D activity and where the business base is primarily comprised of micro and small enterprises, regionally based world class researchers will be inclined to look for partners in other places, causing knowledge and innovation to spill away from their own region.

Again these measures range from the straightforward and transactional through to the long term and transformational, which depend on the ability of the university to capitalise on its external linkages and synergies with other areas of activity.

3.2 Graduate Enterprise (training, placements, new firms)

Description

There are generally three main thematic areas deployed by universities to support entrepreneurship among students and recent graduates;

- training in the skills of 'being enterprising'
- providing business experience through placements in local SMEs
- supporting them in the creation of new ventures and the exploration of new business opportunities. This support can include things like
    - Assistance with compiling a business plan
    - Free office space and equipment
    - Free access to meeting and administration areas
    - Specialist industry advice from business mentors
    - Grants and financial assistance

Potential impacts for regional development

Universities that are actively promoting and supporting entrepreneurship amongst students and graduates are supporting their local and regional economies two key ways; firstly by adding to the pool of businesses in the economy; and secondly, by retaining high skilled individuals in the region.

Issues and challenges

It is important to ensure a close cooperation between the universities, the private sector and authorities responsible for delivering regional strategies to ensure there is coordination. Otherwise there can be resentment and tensions if graduate businesses are seen to displace or distort existing businesses and markets.

In addition, there may be a benefit to regional policies and strategies to create a common thread between graduate enterprise and broader sector development activities. For example a region which is aiming to become a global leader in ICT might want to encourage graduates to consider starting businesses in this industry rather than another less strategic one.

There also needs to be strong links between support for graduate enterprise development and the 'mainstream' support to businesses in the local area, otherwise new graduate businesses may find themselves isolated once they move on from university incubation support.

Case study

Adam Mickiewicz University Foundation, Poznań, Poland

The Adam Mickiewicz University Foundation has been promoting entrepreneurship among students and university staff since 2000 through its Poznań Science and Technology Park. The Foundation has actively encouraged the setting-up of new firms through, for example, business plan competitions. In 2005, ESF started to support its activities and co-funded two editions of the competition in the Wielkopolska region: An idea to start a new business and Promotion of academic entrepreneurship. The competition included a consultancy stage with 116 admitted participants. There were 28 contest winners, all of whom started their own businesses.

http://ec.europa.eu/employment_social/emplweb/esf_projects/project.cfm?id=13638&lang=lt

3.3 University Spin Outs

Description

'Spin outs' is a term used to describe a process by which employees identify an opportunity to commercialise elements of the research or knowledge base within the university. Usually the desired outcome is the establishment of a new, independent enterprise, though it may retain strong links back into the university it originated from. There may also need to be legal frameworks governing the future exploitation of the research, ownership of intellectual property rights etc. Many universities and regions look to the Massachusetts Institute of Technology (MIT) in the USA as one of the most successful models of how spin outs have contributed to the development of a world class knowledge based economy in its surrounding area.

Potential impacts for regional development

Spin out companies are seen as almost unambiguously beneficial for their regions. The received wisdom is that these companies are innovative, high-tech, growth orientated and generally embodying all the desirable traits of the 'knowledge economy'. They are also seen by some policy makers as a relatively cheap way to promote the development of their economies, as the knowledge and human capital is already present in the region.

Issues and challenges

However these characteristics are not common to all spin-outs, but tend to be based on stylised facts derived from a relatively limited number of high profile regions with successful spin-outs rather than a predictable outcome for any situation.

In order to achieve significant impacts on the regional economy, spin outs need to have world class resource of commercially exploitable research which needs to be linked to a larger strategic trajectory nationally or regionally. Spin outs themselves are rarely sole actors of change.

There may be opportunity costs in involving academics in commercial endeavours, diverting them from their core activities of teaching and research.

Case study

The 'Technoinkubator' of the Krakow Technology Park, Poland

One component of the € 4,000,000 investment (of which € 3,000,000 was ERDF) in the development of Krakow Technology Park is the establishment of a Technology Incubator for academic entrepreneurs, to foster the creation and further development of companies in the advanced technology sector.
As well as providing facilities such as high quality office space, office equipment and meeting and seminar rooms, the Incubator also offers a range of services including:

- Access to a database of valuable contacts for new enterprises;
- Assistance in finding potential business partners;
- Help in identifying sources of funding for business start-up and development.

http://ec.europa.eu/regional_policy/projects/stories/details_new.cfm?pay=PL&the=51&sto=1496&lan=7&region=ALL&obj=ALL&per=2&defL=fr

3.4 Network and Cluster Development

Description

Networks and clusters development initiatives are concentrated on encouraging and supporting inter-firm collaboration, institutional development and support in targeted industrial sectors. The sectors are usually targeted at those that offer the most local economic development potential. Where the local economy has existing clusters this may provide a more targeted approach to improving economic development activity by leveraging resources in the direction of greatest potential return.

Potential impacts for regional development

Cluster development can help identify a region's economic strengths, identify realistic ways to shape the region's economic future and help distinguish itself from other regions. It creates synergies within sectors, as local firms trade with each other, collaborate on projects and provide a platform for shared marketing activities. There can be other less direct benefits for the region as well. Networks and cluster groups provide a medium for intelligence gathering about the sector for regional policy makers. For example, networks and clusters have been pivotal in developing demand led skills strategies in some local areas and regions. Effective network and clusters can develop and grow with minimal ongoing public investment, as companies are willing to pay for membership of groups which bring tangible benefits.

Issues and challenges

Network and cluster development is not about 'picking winners', though this at times seems to have been a driver behind some public initiatives. Research in the area is clear that clusters can rarely succeed if they are not formed around an already existing critical mass of businesses that have a common business objective or need.

Another common error is to adopt a 'one size fits all' approach, or try to import a successful model from another place or industry. It is important to take a tailored approach to the particular challenges and characteristics of each industry. Some clusters may value a strong formal industry organization and cooperate very closely on issues of market development, while others may rely on less formal collaboration.

Case study

Aalborg University , North Denmark Region, Denmark

The overall aim of the BrainsBusiness initiative is to ensure that North Denmark can maintain its leading position within ICT through its ICT cluster. The initiative focuses on strengthen the cluster both internally and externally and maintaining a strategically focus on ICT as the sector with the highest growth potential. The initiative seeks to develop tools to underpin the triple helix collaboration and strengthen the impact of the ICT cluster on the local industry and economy.

http://www.brainsbusiness.dk/en/the_north_denmark_ict_cluster/

3.5 Encouraging Intellectual Property Development

Description

Intellectual property (IP) refers to discoveries, creations and inventions for which a set of exclusive rights are legally recognised. Patents are one of the more common frameworks for establishing exclusivity and protection of a new invention. Patenting and IP protection aim to ensure a fair return to the inventor for their investment in the research and development of new knowledge and technologies.

Potential impacts for regional development

Patenting and IP protection are vital ways to foster continued national innovation. Research shows a positive correlation between high levels of patent applications and regional and national economic growth. IP protection is an important source of revenue for many research institutions, and a stimulus to further research and innovation and to science/industry partnerships.

Issues and challenges

However, patenting and IP protection has become an expensive industry in its own right, to the point where protecting a technology may cost more than the technology can return. It diverts efforts that should be put into disseminating new knowledge into, often fruitless, legal entanglements.

Patents are frequently taken out when a commercially shrewder course would be to be first to market. IP has also become a tradable good in ways that do not reflect the true value of the knowledge to humanity, but rather its value to financial speculators.

In an era of growing 'social' and 'open' innovation facilitated by new technologies, some critics of IP protection believe it conflicts with the principle of the free and rapid sharing of human knowledge. It is argued that IP protection may exclude large portions of humanity from the benefits of science, retard its delivery or price it beyond their reach, distort the focus of public good research from what benefits society to what is profitable for a few, and help undermine community trust in science.

Case study

The Portuguese Institute of Industrial Property (INPI)

The Portuguese Institute of Industrial Property (INPI) launched an ERDF co-funded project (2001-2007), the UIPP Project, which was aimed at bringing the National Patent Office closer to companies and universities. It provided services to researchers and students as well as to SMEs for pre-diagnosis of IPR needs. Eligible costs included training, awareness activities and seminars, IPR advertising and dissemination, technical assistance and advice by specialists. UIPP promoted partnerships and established a network between 2 business associations, 10 universities, 7 technological centres and 3 science and technology parks. Between 2001 and 2007, the number of hi-tech patent applications to the EPO per million inhabitants increased from 0.4 to 7.5 in Portugal (European Innovation Scoreboard).

http://www.innovaccess.eu/documents/20081211brussels/11-Dinis.pdf

3.6 International Linkages

Description

As with other types of institutions, universities are increasingly operating in a globally competitive marketplace, both in terms of student recruitment and attraction of academic staff. This has led to a growth in international partnerships and collaboration also has a knock-on impact on staff who are likely to be required to be more internationally mobile if involved in research projects or teaching programmes, which could include exchanges or periods teaching overseas. Many universities now have a clearly articulated international strategy which aims to explicitly acknowledge this trend and capitalise on the benefits of these linkages for student recruitment, research and teaching.

Potential impacts for regional development

A globally connected university acts as a 'window' on the region, and builds and enhances the image and reputation of the region to the wider world. This can benefit the development of the region in a number of ways; connecting people from all over the world into the region which can act as a vehicle for future cooperation; attracting researchers from around the world who will contribute to the development of new technologies which may result in new, innovative spin out firms being established; act as a lever for international investment as firms grow around areas of international specialism and expertise.

Issues and challenges

The flows can work in both directions – just as universities can attract intellectual and human capital into a region, equally their scientific and technological expertise can leak out of the region to other places.

Case study

Knowledge Economy Skills Scholarships (KESS), Wales, UK

Managed by Bangor University on behalf of the HE sector in Wales and part funded by ESF, the Knowledge Economy Skills Scholarships programme (KESS) currently has 302 doctoral and masters level research projects in collaboration with companies across the convergence region of Wales. With its focus on developing higher-level skills in the region and boosting the research and development capacity of businesses, KESS is reaching an international audience both through its company links and the quality of research being undertaken. KESS is helping welsh universities, businesses and students compete on a world stage through:

- Providing the higher-level skills and international networks that enable welsh businesses to increase their R&D muscle and compete in a global market;
- Scholars showcasing their collaborative research at international conference in the Americas, Australasia and Europe;
- Exchanging best practice in collaborative doctoral research through the European Industrial Grad School Network (E-IGS)
- Enabling access to international training opportunities for the scholars on the scheme and widening the horizons of collaborating companies.

http://www.higherskillswales.co.uk/kess

SECTION 4 CONTRIBUTING TO THE DEVELOPMENT OF REGIONAL HUMAN CAPITAL AND SKILLS

4.1 Introduction

The development of skills and knowledge assets in the workforce is, for many regions, one of the most critical tools in achieving their regional innovation strategy for smart specialisation objectives. Evidence from the OECD and others supports a strong correlation between productivity growth and educational achievement. Therefore regional actors and agencies in both the public and private sectors value the presence of universities in their regions and often seek ways to maximise their role in the development of the human capital of the region, both in building the skills of the indigenous population and also acting as an attractor of external talent.

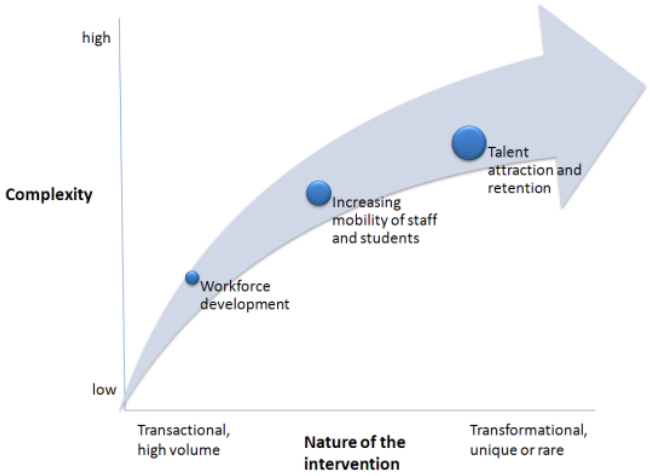

Figure 4.1 Development of regional human capital

While a universities' core activity is teaching, students might be from outside the region and even from other countries, and indigenous students might not stay in the region after graduation. It is therefore not realistic to expect universities to design teaching programmes only around regional needs. However at the same time they are a great resource in building human capital, so it is critical to find ways of encouraging them to participate in the process.

There is often a miss-match between the demand for and supply of skills in the local economy, which can have a negative effect on economic development and innovation potential. Design and provision of training programmes in direct response to employer needs can have a significant impact on the regional economy. However this requires moving beyond traditional delivery models to tools such as distance learning, on-site teaching, modular programme design, new approaches to accreditation and better use of private sector in design and delivery of training programmes. In order to deliver effective workforce development there needs to be good labour market intelligence and future skills needs forecasting. This requires strong partnership working between universities, employers and other learning organisations, which should be facilitated by the public sector.

Promoting exchanges between university staff, students and SMEs can be an extremely effective way of not only exposing the SMEs to benefits of employing graduates, but also helps build linkages and breaks down barriers between the university and the private sector which may lead to future collaborations in other areas (e.g. research, consultancy). There can be potential for real transformative effects as SMEs are exposed to the knowledge assets of the university via its staff and students.

The presence of universities in a region, particularly ones with a high profile nationally and internationally, can act as a real 'magnet' for talent. This can be in the form of students, but also academic and research staff who come to work in the institution. Where the research expertise of the university maps onto the sectoral specialisms of local industry this can create a powerful 'hub' for innovation activity.

There are also proactive programmes aimed at retaining graduates in the region, something which is of critical importance in regions where higher level skills are in short supply. Universities can also be agents in attracting former students back to a region via their alumni networks. These people can be even more valuable in human capital terms than retained graduates, as they bring new experiences, knowledge and networks from their time away from the region.

4.2 Workforce Development (skills development programmes)

Description

Workforce development projects are skills development programmes which are designed to meet the needs of the employer (by meeting a current or future business need); the employee (in terms of their career progression and professional development); and the region (by ensuring the right skills exist to build regional advantage in line with smart innovation strategies). For this reason Universities need to be highly flexible in how courses are designed and delivered to ensure they are relevant for both the targeted industry and its employee.

Potential impacts for regional development

Workforce development programmes can have a profound effect on the region by exposing people to skills and knowledge they would not otherwise have access to, improving links between universities and business and involving universities in the development of specific key sectors in the regional economy. Connections with the university can help to raise the profile of regional sectors and clusters as they become more connected to the university and its networks beyond the region. As workers become more skilled they are more valued by employers – not only can this attract new companies to the region but also makes them more 'sticky' as they are reluctant to lose the workers they have invested in training.

Issues and challenges

Rapidly changing economic conditions can make ensuring the long term value of workforce development difficult, especially in areas of rapidly changing technology. Skills learnt today might be obsolete in a short space of time, making employers reluctant to invest.

There is a challenge in balancing the needs of individual employers and employees for tailored solutions with the need to achieve economies of scale. While there is a need to ensure that programmes are sustainable to deliver, they should not lose their relevance to the businesses.

Ensuring the future skills needs of the region are addressed is more difficult than responding to immediate needs, and requires a high degree of public investment in intelligence gathering and forecasting, as well as means of persuading universities and employers to respond.

Case study

Open University of Catalonia (OUC), Spain

The current high levels of competition and technological, economic and business complexity mean that training has to involve specific contents and skills for each business and sector, and to adapt to the characteristics of each organisation. OUC's International Graduate Institute's learning model offers companies and institutions the ideal e-learning system, in terms of both quality and performance, which allows for the simultaneous training of geographically dispersed groups; enables the training of highly mobile groups; focuses on professional competencies; is highly flexible, segmented and customised; improves efficiency of investment in training.

http://www.uoc.edu/portal/english/

4.3 Increasing Mobility of Staff and Students (internship and placement)

Description

Mobility programmes are those which encourage movement of university staff and students between the university and the public and private sector in the region. In some cases there may also be staff from other sectors posted to the university, but this is often rare and tends to be on a more 'ad hoc' visiting basis (e.g. some business schools have 'entrepreneurs in residence').

Potential impacts for regional development

As with most interventions, mobility programmes can have a number of effects for the region. Firstly it can increase employability, particularly in the case of students, by giving them 'hands on' experience in the workplace. Secondly it promotes knowledge transfer, and 'unlocks' some of the intellectual assets of the university for the benefit of the host organisation. Thirdly it can help to build 'boundary spanning' skills, especially among academics, which in turn can create opportunities for future collaborations by breaking down barriers between the university and other sectors.

Issues and challenges

One of the most significant challenges to the success of mobility programmes, particularly for senior academic staff (who are probably the most valuable to industry) is that career progression routes in universities, especially the most research intensive ones, can act as a discouragement to mobility. Career minded staff are better off staying within the university and helping it to achieve its academic outputs if they want to progress within the institution as this is often valued more highly than engagement activities.

Where there is a lack of alignment between the research and teaching specialisms of the university and the sectoral specialisms of regional businesses, mobility programme will be less likely to succeed. Businesses will see students and staff as being of little relevance to their operations, and people within the university will not be motivated to move out if there is no link with their research field.

Case study

Graduate Advantage, West Midlands Region, UK

Graduate Advantage is a Graduate Placement Service, which sees the West Midlands universities working together with small companies, to achieve the aim of creating 100 new jobs in the region and help over 200 businesses, through 1,200 internship opportunities. With £1.6 million from the European Regional Development Fund (ERDF) and matched with funding from the region's universities and the private sector, the 3-year service will look to keep graduates in the region, with a long term goal of boosting business performance to help the economy.

http://www.graduateadvantage.co.uk/

4.4 Talent Attraction and Retention (incoming mobility, fellowship)

Description

Talent attraction and retention refers to interventions aimed at enticing individuals with specific skills and attributes to move in to, return to, or remain in the region. These approaches are increasingly replacing inward investment as a key task of regional agencies. Incentives can vary from tax breaks to support schemes for academic career development.

Potential impacts for regional development

Impacts can be powerful, as there is a clear link between presence of highly skilled people and regional growth. Clear targeting of people with specific sectoral skills can help build up a critical mass, which in turn can act as an attractor of other individuals and businesses.

Issues and challenges

Interventions need to be carefully designed. Different types of migrant will respond to different incentives, so it is important to be clear who is being targeted and why.

Policy makers need to work very closely with their universities, businesses and other sector based institutions when designing programmes to ensure there is coordination of efforts, otherwise the effects will be diluted or even cancel each other out.

Talent attraction policies need to be customised at the local level – there is not a 'one size fits all' approach and success in one region is unlikely to be directly replicated elsewhere as its success is highly dependent on local conditions.

Case study

SoMoPro, South Moravian Region, Czech Republic

SoMoPro is a regional grant programme, which aims to attract foreign researchers to work and undertake research training in a research institution in the South Moravian Region for the period of 1 to 3 years. SoMoPro is co-financed by Marie Curie actions (COFUND) in the period 2009 to 2013. Researchers applying to this programme need to identify and develop a research training project that will provide the means to significantly advance in their career. A fundamental concept underlying this action is that of advanced training and life-long learning. In essence, the fellowship should enable the researcher to progress in the development of his/her career and should not represent a temporary solution. The fellowship is expected to be a part of a structured, long-term professional development plan that is coherent with past achievements and clearly defines the future aims of the researcher.

http://www.jcmm.cz/en/somopro.html

SECTION 5 IMPROVING SOCIAL EQUALITY THROUGH COMMUNITY DEVELOPMENT AND 'PLACE MAKING'

5.1 Introduction

The concept of universities being 'of service' to their local communities is not a new one. In fact in the case of the US 'land grant' universities and the English 'civic' universities founded in the 19th Century this was core to their purpose. Universities in general, regardless of their history and mission see some kind of contribution to social and cultural development as part of their role.

It is well evidenced that societies where the gaps between the wealthy and least well off are narrowest and there is above average participation in higher education and cultural activities, they are most likely to also experience stable and sustainable economic growth. Universities have a key role to play in this process as they find ways to unlock their intellectual and financial resources for the benefit of wider society.

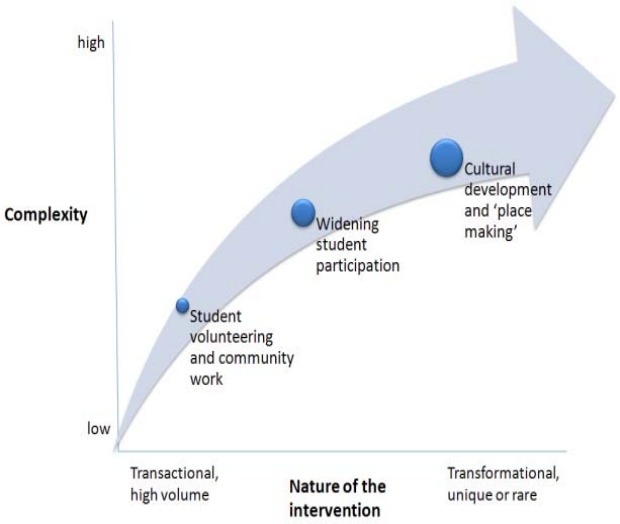

Figure 5.1 Community development and 'place making'

One of the greatest resources a university has is its people, not only in terms of staff but also the thousands of students who attend it each year. These are people coming often from far flung places, with a wide range of experiences and knowledge, with energy and enthusiasm that can be harnessed in ways that may be beneficial to the wider community. Many universities run student volunteering programmes, where students participate in community based projects and programmes. These activities can potentially improve skills of students, connect the university to its community and help overcome specific social issues affecting the local area.

In less favoured regions in particular, there is a danger of universities becoming 'cathedrals in the desert', populated by high achieving people from other regions who move away again as soon as they graduate and so create little benefit to the local population. Working with their regions, universities can help to address the substantial issues of worklessness and low skills in the population, primarily through activities aimed at widening access, in other words, raising aspirations and participation in higher education among local people.

Universities can make a significant impact on their regions through delivering culture based learning programmes, infrastructure (e.g. museums, galleries, music venues) and building infrastructure that improves and enhances the local area which in turn makes it more attractive to indigenous and migrant populations alike. While these activities might be undertaken as part of the institutions core mission of research and teaching, in less favoured regions in particular where public and private funding is limited, universities can 'steer' investments in ways that can have a beneficial impact beyond the immediate campus.

5.2 Student Volunteering and Community Work

Description

Many universities offer programmes that enable students the opportunity to get involved in activities beyond the remit of their academic pursuits and 'give something back' to local communities. The objectives of these programme is often to create more rounded individuals by helping them build problem solving skills which in turn enhances their chances of future employment.

Potential impacts for regional development

Well thought out programmes will not only deliver the objectives of improving student skills, but also help to mobilise the student population to address wider societal problems. This can also help in making connections between universities and local areas which may result in future mutually beneficial partnerships.

Issues and challenges

The primary motivation behind these programmes is usually one of enhancing the student experience and therefore making the university a more attractive option in an increasingly competitive higher education 'market'. The danger is that local communities are not involved in the design of volunteering programmes and that they are not matched to meeting genuine needs.

Interventions may be short term in nature with limited scope for follow up activities or linkages to wider development programmes. In this case the impact will also be limited and local communities might become cynical about the involvement of universities and students in their activities.

Case study

Project SAUCE, Pan European

The project SAUCE (Schools at University for Climate and Energy) contributes to the aims of finding ways to act responsibly with regard to natural resources by developing energy education in primary, secondary, and higher education. Using student volunteers, seven European universities and the Berlin Energy Agency have joined forces to develop and promote university programmes for schools as an innovative educational tool aiming to make younger generations adopt intelligent energy behaviour. SAUCE is supported by the EU Programme Intelligent Energy Europe. This programme aims to promote energy efficiency and renewable energy sources to encourage people to produce and use energy in more intelligent ways and increase the use of renewables.

http://www.schools-at-university.eu/

5.3 Widening Student Participation to under-represented social groups

Description

Widening participation programmes aim to address the discrepancies in the take-up of higher education opportunities between different social groups. Under-representation is closely connected with broader issues of equity and social inclusion, so success in this area will impact positively on social justice and economic competitiveness. Activities are often focused on raising aspirations among target groups by exposing them to the university to make it more 'accessible'.

Potential impacts for regional development

Regional strategies for economic growth need to also ensure that the benefits of growth are not only felt by an elite few but by society as a whole, regardless of gender, age, social class, ethnicity or disability. By taking positive action to close the gap in participation universities can help to ensure that the whole region can be part of and benefit from economic development which will ensure a more sustainable future for all.

Issues and challenges

Low participation rates are often a symptom of more deep rooted problems of low skills, endemic and multi-generational worklessness and social exclusion. Widening participation programmes are only one aspect of what needs to be a strategic and collaborative approach to overcoming these complex problems.

Universities often lack a systematic approach to widening participation which is further diminished by financial pressures and competition which drives them towards the most able students rather than those with greatest need.

Some commentators go as far as to question the ethics of widening participation programmes, claiming it promotes a narrow, middle class concept of 'success', and claiming that gaining a higher education alone will not address the gap in attainment later in life.

Case study

UCC PLUS+, Cork, Republic of Ireland

UCC PLUS+ was established in 1996 as part of a new nationwide infrastructure initiated by the Higher Education Authority (HEA) to tackle the inequality of access to higher education. The goal was to attract and retain disadvantaged students in third level education. The UCC PLUS+ programme has a system of pre-entry and post-entry supports available to students. These include second level aspiration raising activities, a financial bursary, extra tuition, one on one meetings and ongoing social support from staff. UCC PLUS+ is funded by the Higher Education Authority, Department of Education and Science and the European Social Fund. In addition, private donors have provided the UCC PLUS+ programme with essential funding for programme activities and student bursaries.

http://www.ucc.ie/en/uccplus/

5.4 Cultural Development and 'Place Making'

Description

This looks at the ways in which universities can contribute to the cultural development of the area through promoting cultural activities and infrastructure, but also more generally by enhancing the amenities in the area through investment in capital development projects. Universities are often a key partner in the development of museums, galleries, theatre, art studios and galleries, and there may be strong links back to the research expertise of the university which helps promote the area as a cultural centre.

Potential impacts for regional development

Richard Florida[22] has led the debate for many years on the impact of cultural activities in a region in proposing that the presence of a 'creative class' who are attracted by the presence of cultural assets can act as a boon to economic development, innovation and tolerance.

The investments made by universities in developing creative and commercial 'hubs' can act as an attractor of further private sector development to commercial businesses, something of particular importance to less favoured regions where public funds may be limited.

Issues and challenges

A focus on cultural and creative activities can be perceived as 'elitist', with new hubs seen as only relevant to a small minority. Few universities and regions have been effective at using sporting activities in the same strategic way as they have collaborated on cultural development, but sport may have more potential to 'reach out' to a wider section of the population.

Strong partnerships between the university, public and private sectors is essential to ensure that projects and investments complement and enhance each other and that economies of scale are maximised.

Case study

Universeum, Gothenburg, Sweden

Universeum is Scandinavia's largest science centre, located in the heart of Gothenburg. Since opening in 2001, the centre, which offers unique experiences and activities such as challenging, experimental exhibitions in exciting, vibrant environments, has had over 4.5 million visitors, half of whom are children and adolescents. The Universeum was founded by Chalmers University of Technology, the Gothenburg Region Association of Local Authorities (GR), the University of Gothenburg and the Western Sweden Chamber of Commerce. Currently, the Universeum operates in the form of a limited company, owned by the Korsvägen Foundation. The members of the Foundation represent the broad national interest of the business. Universeum is an arena for meetings between schools, companies and the research community. By working together with partners, implementing school programmes, future days, special exhibitions, seminars and other activities, Universeum provides space for creativity and new initiatives and encourage the curiosity of young people and encourage the desire to learn more.

http://www.universeum.se/index.php?lang=en

[22] Richard Florida The rise of the creative class (2002)

SECTION 6 BARRIERS, CHALLENGES AND ENABLERS TO EFFECTIVE ENGAGEMENT OF UNIVERSITIES IN REGIONAL DEVELOPMENT

6.1 Introduction

As has been demonstrated in the previous sections, there are a number of ways in which universities can contribute to the development of their regions strategies for innovation, growth and sustainable development. The case studies highlighted testify to the fact that much activity is already taking place across Europe, in many cases supported by European structural funds as well as national, regional and local funding instruments.

However in order for the benefits of these mechanisms to be maximised, it is necessary for them to take place within a coordinated framework that seeks to derive greatest effect from the mobilisation of a region's universities. As was shown from the depiction of the different intervention types along axes of increasing complexity, the more transformational the project, the greater are the barriers to its effective deployment.

The mechanisms described in the previous four sections can be delivered as individual, stand-alone projects, as a component of a wider strategy or programme or within a development framework which has been agreed collectively by the regional actors. The latter is the ideal and will ensure maximum impact but is very difficult to achieve as there are many barriers to overcome and there are few good practice examples to draw on.

These barriers can be either internal to the institution and its capacity to 'reach out' to the wider region (i.e. supply side) or the capacity and willingness of the public and private sector actors in the region to 'reach in' to the university to seek expertise and knowledge that can contribute to regional growth and development (i.e. demand side). The experience and competence of both the region and the universities is likely to be more limited in building consensus at a strategic, potentially transformational level in comparison to the experience of delivering stand alone projects and specific interventions.

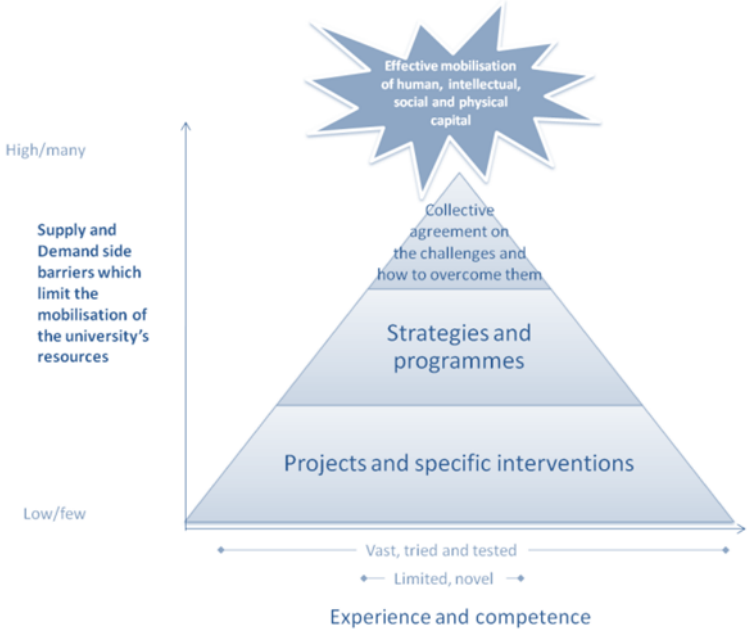

Figure 6.1 Barriers increase as activities become more transformational

Figure 6.1 suggests that as regions move from stand alone projects and interventions through to more coordinated strategies and ultimately a shared agreement across the partnership about what the challenges are and how they can be overcome, the barriers increase and experience of successful delivery is more limited. However, the potential 'prize' of reaching this point is the effective mobilisation of the human, intellectual, social and physical capital of the regions' universities.

6.2 The nature of supply and demand side effects

In order to effectively support the development and implementation of 'smart specialisation' strategies, regions and their universities will be required to work together to implement increasingly complex and transformational programmes and strategies (as opposed to more transactional and short term interventions).

As well as ensuring a 'supply' of the mechanisms that can contribute to the regional development process, enabling this shift will require an understanding of the 'demand' side of the economy for innovation and new types of interventions. This is especially critical in less favoured regions where the innovation gap is bigger, as not only is ***investment*** in innovation lower in less favoured regions but also the ***capacity*** to absorb innovation is lower. Therefore policies that merely promote further investment in supply side interventions in universities will almost certainly fail to achieve the goals of a smart specialisation strategy, as they do not address the underlying issues that impede the ability of regions and universities to effectively collaborate to translate research and knowledge into innovation and growth. Furthermore in less favoured regions investment in the supply side interventions without addressing demand side problems may even have a direct detrimental effect on the relative position of the economy as research findings spill over into more favoured regions where absorptive capacity is higher and thus demand is greater.

Barriers and enablers can be grouped into the following themes, and each can be assessed from an internal perspective (i.e. supply side) or as it pertains to the external environment (i.e. demand side).

- Perceived institutional purpose
- Channels of engagement
- Funding sources
- Operating principles
- Industrial composition
- Link between systems
- Collaborative capacity and skills

Table 6.2 summarises the conditions under which these barriers tend to manifest themselves, and whether the effects are caused by issues with the demand side or the supply side. In Section 6.3 the barriers/enablers are then looked at in more detail with reference to five case studies where regions have successfully addressed the challenges and optimised the impact of their universities on regional development.

	Can be an internal barrier when	Can be an external barrier when
Perceived institutional purpose	Research and knowledge development activities are disconnected from regional development objectives and are driven by the pursuit of peer reviewed academic outputs	The region does not see universities as relevant or central to its regional development strategies; senior managers in the public and private sectors do not see the universities as a regional asset
Channels of engagement	Universities lack the mechanisms to effectively engage with the 'outside world' or activities are hived off into special purpose vehicles and not seen as 'core' activity	Lack of effective 'bridging' institutions between academia and the private sector to 'reach in' to the university
Funding sources	Universities focus research in areas where research grants are easier to win rather than regional priorities; structural funding programmes are seen as high risk due to regulations and intervention rates	Lack of capital for firms to invest in R&D activities; short term funding cycles limit the ability to invest in 'translational' organisations to help convert research into a foundation for industrial specialism
Operating principles	Academics see themselves as 'critical observers' rather than actors in the process of regional development; focus is on achieving peer accolades rather than solutions to 'real world' problems	Public and private sectors are alienated by academic language and work patterns; there is suspicion of the motivations of universities and whether they are 'in' the region but not 'of' the region
Industrial composition	Academic teaching and research profile of the universities in the region does not mirror the industrial ambitions of the region	The local economy is built around declining industries and populated by small companies with little sectoral critical mass
Link between systems	Universities are part of national higher education system so have little incentive or scope to respond to regional need	There is a conflict between national innovation and competiveness and territorial development policies; Lack of regional voice or autonomy in decision making; lack of regional leadership and/or consensus on the challenges
Collaborative capacity and skills	University staff have no time or encouragement to engage with regional programmes; Lack of 'boundary spanning' skills in the university; lack of leadership to drive change	There is limited absorptive capacity within local businesses; there is a lack of mechanisms to aggregate demand; Private sector senior managers don't give consideration to their role within the region; lack of boundary spanners in the public and private sectors; lack of consensus on what the issues are and how to overcome them

Table 6.2 The nature of the barriers

6.3 The Case Studies

Five detailed case studies have been drawn upon to inform the lessons learned and suggested 'good practice' that will be outlined in the rest of this document. These were selected as 'exemplars' of where universities and their regions have effectively collaborated in a systematic and strategic way to either overcome a set of challenges or capitalise on opportunities for innovation and growth. The case studies have been selected for their variety both, in terms of focus and location, in an attempt to demonstrate that 'smart' collaboration between universities and regions is not limited to the most favoured regions or can only take place in regions with 'traditional' university structures. The case studies are briefly summarised below, and further details are in the Annex at the end of this document. All the cases highlighted refer to continuing and ongoing work unless otherwise stated.

Karlstad University in the Swedish Region of Värmland

Fostering network and cluster development

Värmland is a region undergoing long term structural change from 'old' manufacturing and engineering industries to a more knowledge based economy. This case study looks at a particular project, SLIM II (Systematic Leadership and Innovation Management), funded through local and European structural funds, which supported the development of effective business networks and clusters to help promote existing and new collaborations between businesses using the university to coordinate and build linkages. The explicit acknowledgment by the regional authority of the university as a key player was one of the primary drivers of the success of the project which ran from 2009 to 2010.

Newcastle University in the North East of England

Linking university research to industrial opportunity

Over recent years the North East of England has capitalised on its engineering and manufacturing heritage, has restructured its economic profile and moved towards a more diverse and competitive economy by stimulating growth of emerging sectors including low carbon, renewable energy, plastic electronics and industrial biotechnology. Using national and European funding instruments, the Regional Development Agency decided to invest in five "centres of excellence" in areas where there was proven research strength in universities and industrial opportunities which had been identified. This was a key element in the implementation of the 'Strategy for Success', which was launched in 2001. By focussing on areas of engineering where the exploitation of the research base is not characteristically via spin-outs but by the scale up of laboratory processes, this case study highlights the role of *external* agencies providing this capacity rather than *internal* intermediaries like university technology transfer offices.

University Rovira i Virgili in the Spanish Province of Tarragona

Using internal policies to promote cooperation

The Tarragona petrochemical industry is considered the most important chemical hub in southern Europe and the Mediterranean area. It represents 25% of the Spanish chemical industry and generates 44% of all plastics produced in Spain. Rovira i Virgili University have taken the lead in a strategic initiative to support innovation in the industry through its Tarragona Region of Knowledge Office, which has within its main objectives to support fundraising for innovation and R&D projects in companies and to promote territorial strategic projects for companies and for institutions. A key enabler of this deep involvement of the university in the economic development of its region is the R&A (research and academic) Staff Commitment Agreement, an instrument for human resource management which allows staff to agree a portfolio of teaching, research and services/administration activities based on their individual skills and the collective mission of their research groups and the university as a whole.

Combined Universities in Cornwall (CUC) in the South West of England

Investing in an innovative approach to higher education to stimulate growth in a geographically peripheral region

Cornwall is situated in the far South West of England, some three hours from the nearest major city. The peripheral nature of the region and poor connectivity have often created an image of a good place to visit rather than a good place to do business. Not surprisingly, this has resulted in a seasonal dependency on low skilled jobs and a lack of high value and larger, international businesses. Combined Universities in Cornwall (CUC) is a partnership of six universities and colleges working together to give more people the chance to study in Cornwall, and to use university level education to help local businesses and communities to thrive. Investment in the Combined Universities in Cornwall has been one of just a few major strategic investments made by the structural funds programmes, along with infrastructure and fast broadband. The rapid rate of growth of the Cornish economy and specific indicators such as the rate of growth of knowledge-intensive industries has been a mark of the success both of the overall programme and of the CUC investment in particular. Convergence investment in CUC has focused on supporting important new industries including environmental technology, healthcare and digital media, and underpinning enterprise and innovation skills, matched to an analysis of the competitive opportunities available to the region.

Krakow University and Malopolska Region in Poland

Using higher education strengths to attract investment

Malopolska is located in the south-eastern part of Poland and is bordered by Slovakia to the south. The regional capital and largest city is Krakow. The Malopolska economy is one of the most diversified of Poland's regions. In its Regional Innovation Strategy Malopolska targets IT and ICT industries as potential growth areas. Krakow in particular has been very successful in using its historical strength as a centre of higher education to adapt to and enable new economic opportunities by attracting and retaining foreign investment to the region. The size of the graduate pool in a wide range of disciplines, particularly in the disciplines of computing science, accounting and management, make it an attractive destination for software and business process outsourcing companies.

6.4 Overcoming the barriers - lessons from the case studies

6.4.1 Perceived institutional purpose

It is interesting to note that some of the most progressive practices can be seen in the newer Higher Education Institutions, who are actively responding to the challenges facing their region. Older institutions, particularly those who define themselves in terms of research excellence can often find themselves 'locked in' to the pursuit of outputs that maintain or enhance their position in national or international league tables with scant regard to regional needs. There is a real danger that as these newer institutions mature and seek to attract high calibre staff and students that they too become increasingly concerned with the measures of research excellence at the expense of their regional mission. However, in recent years universities have increasingly acknowledged their role in the development of their regions, partly due to increased competitive pressures and the need to demonstrate value and worth to the region, but also in response to the need for better engagement with wider society in order to contribute to the 'grand challenges' facing humanity in the 21st Century. For example, ***Newcastle University*** in its mission statement aspires to be "*a world-class research-intensive University*" but also to "*play a leading role in the economic, social and cultural development of the North East of England*".

It is also important to note the role of the demand side in addressing this barrier. Where the wider region does not see its universities as central and core to addressing its future development, the good intentions of the university alone will not overcome this. In the case of ***Värmland and Karlstad University***, it is interesting to note how the positive regional outcomes have been driven by the prominence the region had given to the role of the university in its regional strategy and the prominence given to the region in the University's teaching and research mission. Similarly for the Combined Universities in Cornwall, the strong role played by regional stakeholders in establishing the initiative is continued through Cornwall Council's active membership of the CUC Steering Group and Executive.

6.4.2 Channels of engagement

Clear access points and communication channels between the sectors is important. A university may have a strong desire to engage with the region and contribute meaningfully to economic and social development through its research and teaching activities, but there may be a barrier in physically 'reaching in' to the university as well as the university failing to effectively 'reach out'.

In the ***University of Karlstad***, a cluster room was established on the campus to enable engagement between SMEs, students and academics. Even more importantly entrepreneurs who had not traditionally engaged with the university were specifically targeted. This approach was shown to have increased trust and proactive collaboration between the actors, which is evidenced by the number of follow on projects and activities that happened as a result.

The example of the ***North East of England and Newcastle University*** showed how investing in 'centres of excellence' designed explicitly to complement the research specialisms of the university not only addressed the supply side of this barrier but also enabled the demands of industry and the region to be aggregated and articulated resulting in the university making structural changes in response.

6.4.3 Funding sources

The higher education sector in common with the public and private sectors is facing enormous challenges arising from the effects of the 2008 global economic crisis. Levels of public funding of higher education have been reduced in many countries, and some are looking to a more 'market driven' approach which in turn places significant competitive pressures on universities. Among the highly regarded universities, this may lead to a 'risk averse' approach to new mechanisms or initiatives, as they increasingly retreat back inside the academy to concentrate on their 'core' missions of teaching and academic research.

Sources of funding and their regulations and guidelines are also important. Universities are familiar with and are structured to meet the requirements of national and international research funding grants. However European Structural Funds (ERDF and ESF) can be seen as a high risk proposition due to an emphasis on outputs and results that are not linked to the core mission of universities and to intervention rates at programme level up to 85% in Convergence regions and up to 50% in other regions. Funding for research through framework programmes can be more attractive as it (currently) has an intervention rate of up to 75%, with some activities even eligible for 100% funding. In addition the application process is more in tune with academic practices (e.g. peer review etc.). However there is a slight paradox at play in the sense that the programmes which depend on the existence of absorptive capacity in companies to participate attract higher intervention rates and are more attractive to universities, while the types of activities that would *build* regional capacity are more likely to fit within the less appealing (in terms of intervention rates) for structural and cohesion funding programmes.

There are also funding barriers affecting the demand side. Difficult economic conditions mean that firms have less capital to invest in innovation, and therefore the research outputs of the university will be less demanded by actors in the external environment. Likewise the public sector may need to curtail investment in research centres and other 'translational' institutions, which in turn might restrict the regional demand for research activities.

In the case of the ***Combined Universities in Cornwall*** this barrier was overcome by the creation of a strong partnership between the various funding programmes at the local/regional level which resulted in the creation of a 'Higher Education Commissioning Framework" that ensured all investment was focussed on a set of thematic areas which had been agreed following a process of independent economic analysis. Funding mechanisms with national operational programmes (such as ESF) were even able to join in the process by agreeing local investment frameworks.

6.4.4 Operating principles

There can be at times a 'culture clash' between the university and the public and private sectors, which acts as a further barrier to engagement and effective partnership working. Academics might deliberately seek to distance themselves from involvement in hands-on regional development by positioning themselves as 'critical observers' of the process rather than taking an interventionist approach. Even where there is a desire to participate in the process, this can be hampered by internal issues such as reward and progression structures, which can often act as a disincentive to getting involved in activities other than 'pure' academic work. However some universities have started to look at ways of overcoming this issue and ***Rovira I Virgilli*** is certainly one which has been at the forefront of developing a highly innovative approach through the development of its 'Staff Commitment Agreement'. This is essentially a

human resources management tool which enables staff and their departments to create a balanced portfolio of activities between teaching, research and other activities.

Externally, the world of academia can be perceived as existing in an 'ivory tower' by the public and private sectors. Businesses find academic language and working practices alienating and off putting, and fear the ability of university staff to function in the 'real world' where action is valued above reflection. The Public sector, particularly at local and regional level, can be suspicious of the motivations of universities, fearing that they pursue academic excellence at the expense of a territorial focus which would benefit the region. In ***Malopolska region in Poland*** the creation of an ICT Cluster project which brought together the key private, public and higher education partners in the region to work towards a set of mutually beneficial objectives for the development of the sector in the region has gone a long way to break down the barriers between the different sectors.

6.4.5 Industrial composition

The connection between the academic profile of universities (subject mix) and the sectoral structure of their regions will have serious consequences for their desire and ability to work together. In some regions, universities will have been established in direct response to the industrial needs of the surrounding territory. However this may have reflected an industrial heritage that is no longer relevant to the region (e.g. ship building, mining, heavy engineering). In other cases universities might see themselves as players in a national or even international marketplace, and design their 'offer' around responding to market demands for skills and research rather than any connection with the regions in which they are located. One way this was overcome in the ***North East of England*** was by a strategic investment by the Centre for Process Industries (one of the five 'centres of excellence') in the creation of a senior academic post in chemistry at ***Newcastle University***, where the university had strengths in chemical engineering but not in the industrial bio-technology and catalysis fields.

On the other hand, universities may have been proactive in changing their areas of focus and specialism to better meet the needs of 21st century students and businesses, but find themselves in a region where the private sector has not made the same adjustments. Businesses that are 'locked in' to old structures and ways of working will be less inclined to engage with universities, especially as they see the universities increasingly focus on 'new' sectors and technologies. In the case studies, ***Malopolska and Krakow University*** is a good example of how a region and its university have worked together to drive changes in the industrial composition, which has resulted in a mutually beneficial relationship where the university attracts and supplies high quality graduates for the city's growing IT sector while the growing businesses generate demand for the universities intellectual resources. Both together have created a critical mass of talent and investment which have in turn helped to drive the regional economy.

6.4.6 Link between systems

While many older universities were established to meet the needs of their immediate hinterlands, since the middle of the last century many countries have adopted national approaches to higher education which has resulted in universities being sucked into a national system which provides little scope or incentive to 'regionalise' their activities or areas of focus in terms of research and teaching.

Likewise for the public and private sectors, the extent to which they have autonomy and control over competiveness and territorial development policies will determine the extent to which they can place demands on their universities. Where the region has the ability to design and fund regional development strategies there will be a greater likelihood of the inputs of universities being sought out.

Agreement between national, regional and local decision-makers was key to the successful establishment of the ***Combined Universities in Cornwall***, and to its subsequent growth. Local policy-makers committed to a long-term strategy of investing in higher education through the Objective 1 and Convergence programmes, but essential match funding was required from national government, from the national Higher Education Funding Council in the form of both capital and funded student places, and from the Regional Development Agency, all of whom backed the local strategy with substantial investment in building physical and human capital. As a result, centres of excellence in the environment, human health and creative sectors have been established and are now competing internationally for research funds and future students while also meeting ambitious targets for regional business and community engagement.

6.4.7 Collaborative capacity and skills

The university will be hampered in its ability to work with regional partners if there is restricted capacity for academic staff to engage with regional interventions. This may be because there is a high degree of emphasis placed on academic outputs which have no resonance regionally, or because mechanisms for reward and recognition place no value on engagement.

In cases where there is the desire and encouragement for university staff to work with businesses and public sector bodies in the region, these efforts may be frustrated by a lack of capacity in the region to absorb the significance of research and apply it to their organisations. This might be because the industrial composition of the region is primarily in low tech, small scale industries or where businesses are larger, they do not include the research and development function in their regional operations.

Even in cases where there is a strong overlap between the economic development objectives of the region and university research, and the capacity to collaborate exists on both sides, effective engagement will still be under threat unless the *skills* necessary for effective collaboration[23] are in place.

Furthermore there may be other external constraints placed on the potential for collaboration. For example in some member states there may be legal restrictions on university/business cooperation.

[23] EUIMA "Collaborative research" is a two-year project (to 2012) which will contribute to the development of monitoring tools and indicators for the assessment of university-based collaborative research. In addition, the project will aim at identifying the necessary requirements and adjustments that universities need to make in terms of human resource profiles (researchers, managers, etc.) to take forward and support the development of collaborative research and increase the attractiveness of university careers, both in research and in managing the partnership. The project builds on experience from previous and current EUA work looking at building strong relationships between universities and industry for doctoral education and the professional insertion of PhD holders (DOC-CAREERS & the current project DOC-CAREERS II) as well as at the exchange of best practice in collaborative research through the Responsible Partnering Initiative. Following the EUA study "Regions of Knowledge", the project will address the specificities of regional contexts.

CASE STUDY – VUB CROSSTALKS, BRUSSELS, BELGUIM

VUB CROSSTALKS is a unique kind of academic and corporate networking launched by Vrije Universiteit Brussels in 2003 and is still operating today. Working bottom-up and interdisciplinary, CROSSTALKS wants to create a new dynamic of knowledge exchange through thematic encounters, beyond specific disciplines and with the active participation of key players from all levels of society. An open and collaborative approach is crucial in every CROSSTALKS initiative, ranging from small scale professional workshops to big public events. The CROSSTALKS format encourages constructive dialogues on policy probing issues, engaging academic researchers, scientists, artists, corporate leaders, and creative entrepreneurs in the discussion. Current projects are tackling Smart Logistics, Energy Efficiency, Sustainability and Changeability, Prosperity without Growth?, Bridges over Troubled Water, Cleantech and Transparency in Healthcare. The results of these events are wrapped up in a series of inspiring publications, giving an impetus to future collaborations in research and development.

6.5 Conclusion

How individual universities and regions have overcome the barriers to joint working and the outcomes that have been achieved is clearly illustrated by the OECD Reviews of Higher Education in City and Regional Development. Three of the case studies of individual universities and regions referenced here (Karlstad University and Värmland in Sweden, Newcastle University and North East England and Rovira i Virgili and Catalonia) participated in the OECD review process. Indeed in the case of Karlstad University and Värmland it is acknowledged that the self evaluation for OECD and the subsequent peer review played a key role in building the partnership between the University and the region. The following section therefore draws on the OECD experience to recommend a process through which regions and universities might go about building capacity for joint working. For a fuller understanding of how this process has worked and the outcomes that have been achieved the reader is **strongly recommended** to read the OECD Peer Reviews of Catalonia, North East England and Värmland via the links below:

Catalonia	http://www.oecd.org/dataoecd/28/36/46826969.pdf
North East of England	http://www.oecd.org/dataoecd/16/54/35889695.pdf
Värmland	http://www.oecd.org/dataoecd/27/23/36731313.pdf

SECTION 7 PROCESSES AND PRACTICAL MECHANISMS TO BUILD CAPACITY AND INCENTIVES FOR UNIVERSITIES AND REGIONS TO WORK TOGETHER

7.1 Establishing a regional higher education partnership

This section outlines a process by which public authorities, business and universities can come together to better understand the regional demand and university supply barriers outlined in the previous section and shape appropriate mechanisms to overcome the barriers through the design and implementation of programmes that interconnect the three partners.

At the heart of this process must be a critical evaluation of the ability of the region's public institutions and private businesses to articulate a demand for and capacity to absorb university expertise. If this capacity is not in place public investment in university research for supposed regional benefit and higher level skills for the regional labour market will have limited impact, indeed may well leak out of the region.

The process of building this capacity for three way working proposed here is an elaboration of one used by OECD for its reviews of higher education and regional development in 24 regions in 18 countries– a process which for example made a significant contribution to building and sustaining the Värmland (Sweden) and Karlstad University partnership described in Section 3.

The OECD process was not explicitly linked to public intervention as articulated by the requirements of the European Structural Funds. The extent to which individual European regions wish to initiate a process of engaging universities in regional development alongside or as part of the preparation of strategies for the next programming period will need to be decided. Article 11 "Partnership" of the General Regulation concerning Cohesion Policy [Council Regulation (EC) No 1083/2006, OJ L 210, 31.07.2006, p.25] requires the Programme Managing Authorities to include "... *the most representative partners at national, regional and local level… in accordance with national rules and practices*...". Certainly, representatives of the Higher Education sector should be taken into consideration. However, a process with a specific partnership structure for connecting universities to regional growth may be necessary if there is a danger of universities being 'crowded out' by the large number of other actors involved in drawing up the operational programme. Given the resources required in the process stages outlined below, managing agents could use technical assistance funding from the current programme to build the necessary capacity to mobilise higher education.

The suggested stages for building the partnership are as follows:

1. National and regional managing agents for the structural funds establish a Regional Learning Group (HE) (RLG (HE)) composed of **leaders** of HEIs in the region, the public and private sectors.
2. The RLG (HE) oversees a self-evaluation of collaboration against a template provided by the Smart Specialisation Platform and informed by Community Strategic Guidelines and the national Strategic Reform Plan. This will need to take account of appropriate indicators of the innovative performance of the region.
3. The RLG (HE) invites an international peer review team composed of experts and policy makers drawn from the fields of regional development **and** higher education and identified by the Platform to assess the self-evaluation through meetings with university, public and private sector representatives from the region and nationally.

4. A peer review report is published and the RLG (HE) facilitates debate around its developmental (not judgemental) recommendations for action regionally **and** nationally.
5. Ongoing monitoring and evaluation of the actions taken in response to the recommendations are overseen by the RLG (HE)
6. An updated evaluation is undertaken for a follow up international review after 2/3 years to ensure a dynamic learning process for all of the partners.

In terms of financial support to the partnership and its activities, the Cohesion Policy support to operations of "Technical Assistance" could be used in this context provided it is included in the related Operational Programmes.

The following paragraphs suggest some of the challenges that may be revealed by the above process. While these may include structural obstacles to strengthening the partnership between universities, business and public authorities in the region, the process that is outlined can contribute to the identification and personal development of current and future leaders who are able to work across the boundaries of all three sectors and facilitate an ongoing learning process for themselves and the partnership as a whole.

The formation of a high level Regional Learning Group (HE) is fundamental to the process described above. The RLG (HE) should seek to link the intellectual leadership that **all** parts of higher education in the region as institutions can bring to both the political and managerial leadership of the region. More specifically:

- **Political leadership** – refers to the work of those people elected to leadership positions by the citizenry. These are, by definition, political leaders. Thus, all elected local councillors are political leaders, acknowledging that different councillors carry different roles and responsibilities and will view their political role in different ways.
- **Managerial leadership** – refers to the work of public servants appointed by local authorities, central government and third sector organisations to plan and manage public services and promote community wellbeing. These officers bring professional and managerial expertise to the tasks of local governance.
- **Intellectual leadership** – refers to the resources that leaders in universities working with others can contribute to the development of the region. These leaders can, and often do engage as individuals in conducting research or supporting particular communities or enterprises. But typically this is uncoordinated and highly distributed across the leadership hierarchy in universities. As a consequence these individuals are likely to be working (often very effectively) in isolated silos and can be difficult to locate.

The Regional Learning Group (HE) will need to be supported by a co-ordinator or co-ordinators whose role is to mobilise resources and ensure a connection between individual SC members and their own organisation to ensure follow through and vertical and well as horizontal connections. An early task would be locating all higher education institutions in the region along the lines suggested in the table below and assessing the extent to which these could be considered as an interconnected regional higher education 'system'.

It is also important to understand the role of the European Institute of Innovation and Technology (EIT) and of the Knowledge and Innovation Communities (KIC) in fostering EU wide innovation and 'smart' growth, particularly in terms of how these might relate or link to regional programmes. Regional authorities involved in designing and delivering innovation strategies for smart specialisation should work together with the academic partners in the KIC co-location centres which are in their region, if any, and/or develop partnership with regions hosting co-location centres.

European Institute of Innovation and Technology (EIT)

The European Institute of Innovation and Technology (EIT) is a highly autonomous EU body set up in 2008.[24] It supports currently 3 Knowledge and Innovation Communities which are operational since 2010 and which are set up with a time horizon of 7 to 15 years. KICs integrate partners from business, higher education and research in a structured entity with a results-oriented agenda each led by a CEO. Each KIC is organised around a small number of physical co-location centres spread across Europe (5 to 6 per KIC, in total 16). Co-location has been a key condition in the call for proposals for KICs which defined co-location centres as nodes where people can be brought together to work for significant periods of time.

Based on the current experience, a co-location centre can be described as:

- bringing together education, research and innovation activities addressing strategic areas of innovation and societal challenges;
- based on close proximity allowing for face-to-face interaction and regional synergies; • featuring higher education as a particularly important part of the EIT/KIC co-location activities with the promotion of education programmes around technology, entrepreneurship and technology transfer skills plus cross-disciplinary study programmes;
- being (usually) a separate legal entity with its own management comprising a Director and an executive team;
- being (in most cases) a hosted centre in a higher education institution and supported by technology transfer organisations present within the HEIs;
- a geographical node where all or large part of the innovation web can be found in close proximity providing a centre of gravity to the innovation activities carried out in that node.

The collaborative environment of the KICs and their physical co-location centres offer opportunities for shared activities in the fields of education, innovation and research. Initial results from the existing co-location activities indicate strong potential in the fields of entrepreneurship and knowledge sharing. With view of entrepreneurship, there is evidence that co-location centres can accelerate growth in start-up activity providing a further boost to the impacts associated with entrepreneurial skills. Individuals within a co-location centre are able to use the expertise, infrastructure and capital to gain better awareness of market risks and opportunities. In terms of sharing and exchange of knowledge, co-location centres accelerate knowledge externalities and spill-overs.

On the basis of co-location centres, the EIT incentivizes strong connections between regional hubs of excellence in Europe. The links between the co-location centres are driven by strong leadership, an ambitious portfolio of tasks including higher education activities and clear decision making mechanisms. European value added is created through the co-location centres working together within a KIC.

[24] See for more on EIT: http://eit.europa.eu/ and for the KIC and their co-location centres respectively: http://www.kic-innoenergy.com/, http://eit.ictlabs.eu/ and http://www.climate-kic.org/

7.2 A framework for mapping the regional higher education system

Using the framework below, the group should attempt to 'map out' where the various higher education institutions in their region are positioned in terms of their degree awarding ability and research activities. When populating this framework the group should also consider;

- To what extent are the institutions part of local, regional or national higher education systems
- Where there is research activity – what are the sources of funding, and how do activities play in to regional and national innovation systems
- Who does what? What are the overlaps between institutions? How could these be enhanced? Are there any gaps in regional HE provision? How might these be filled?
- It would also be useful to map the linkages between the institutions and business. Are there any legal or formal mechanisms to link between the institution and the private sector? What (if any) channels exist to share information about the needs of businesses in the region with regards to education and learning and allow business to have a 'voice' in curriculum design? To what extent have universities in the region changed or adapted their activities in response to private sector demand?

	Does not conduct any research activity	Main focus is on applied research in a specific technological field, possibly in connection with businesses	Research intensive – conducts curiosity led research in a range disciplines
Awards higher degrees (Masters and PhD)			
Awards its own degrees			
Awards degrees of other institutions			
Does not award degrees			

Table 7.1 A framework for mapping regional HE systems

7.3 Assessing the connectivity of the universities to the regional public and private sector

The self-assessment commissioned by the RLG (HE) should embrace the contribution of research to business innovation, teaching and learning to human capital development and university engagement with community and place development and the degree of interconnection between all three strands of activity. In particular it should identify progress along the spectrum from **transactional to transformational interventions.** In assessing the **complexity of interventions** this analysis will inevitably need to take account of the extent to which individual universities are **connected** to the region's public institutions and representatives of the private sector. If there is disconnection in the partnership overseeing European programmes this will need to be confronted if higher education's contribution is to be effectively mobilised. So in evaluating the place of HE in the region it will be necessary for all of the partners to address the issues and identify steps that could be taken to draw each sector together in order to move towards the **connected region** where universities are key players.

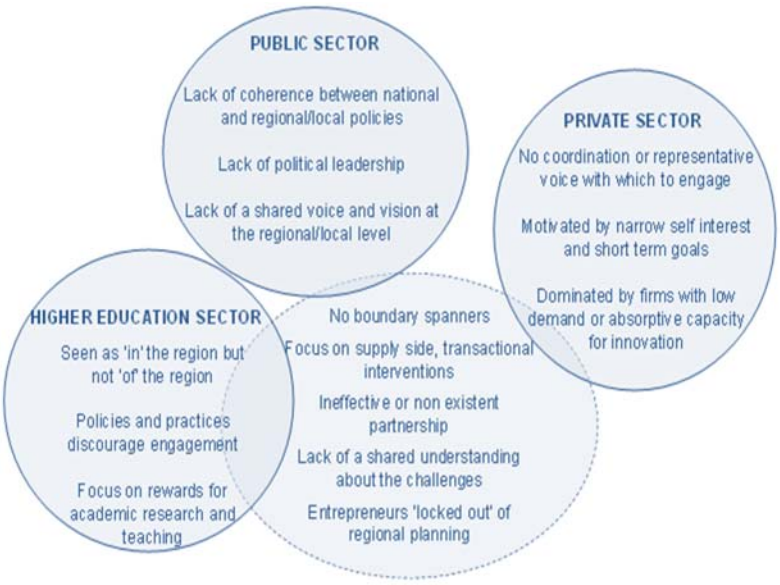

Figure 7.2 The 'disconnected' region

More specifically, building the partnership with universities will be assisted by the extent to which:

- The public sector speaks with one voice in their understanding of the issues facing the region and how to overcome them, and has the mechanisms and political will to build consensus
- The private sector has a coherent and representative voice – for example; through business associations, networks or cluster organisations – and the willingness to work beyond the parameters of the narrow self-interest of their business/sector.
- There are synergies between the intellectual assets of the region's universities and the needs of business in developing innovation capacity.
- The universities in the region see themselves as being 'for' the region and not just 'of' the region and are willing partners in the process.

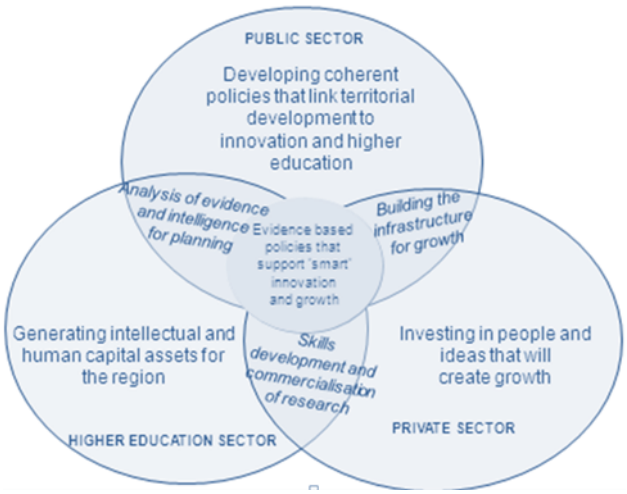

Figure 7.3 The 'connected' region

The appraisal of the degree of connectedness of the three parties within the region will need to take account of the influence of national policies and the extent to which national higher education and science and technology policy may or may not have a territorial dimension. Likewise a range of other policies impinging on local and regional authorities may be 'spatially blind' and work against building links between universities and the region. It is important that these challenges of multi-level governance are recognised in the review process so that as Figure 7.3 suggests, mechanisms are established to bridge the levels. Indeed with its activities

spanning local, national and international arenas as well as numerous governmental functions from business, skills, environment, health and well-being, the university can play a key role in regional joined-up governance.

The strength and degree of connectedness within and between the three pillars of higher education and the public and private sectors will vary across the regions of Europe and this will have implications for **how regional investment in HE related activities is prioritised.** For example some Less Favoured Regions may have academically strong universities but capacity in the local private sector to absorb this knowledge may be limited. In this situation the priority should be to enhance the ability of local businesses to **reach into** to the universities by targeted investment in instruments like innovation vouchers available to SMEs. By way of contrast the challenge facing more successful regions may be to encourage universities to **reach out to** local as well as global business. In both situations there may be a need to exploit the complementary strengths of research intensive universities and universities of applied science given the latter's likely stronger involvement with SMEs and the former's global linkages. Also in the light of possible limited expertise of the public sector in less favoured regions in facilitating research and innovation it may be necessary to invest in intermediate organisations with a clear mandate to foster the connection of universities to local business. In short given the likely variations in connectedness between the three pillars in European regions there can be **no one size fits all** formula emerging from the evaluation process outlined above.

Developing a universities and regions learning system

Figure 7.4 summarises a staged process of capacity building linked to the steps outlined above. It should start with a description of the current regional economic and institutional situation and then move on to scenario building where university experts address such questions as:

- What are the economic, technological, environmental and societal opportunities and challenges facing the region?
- What are the latent assets (physical and human) of the region **and** within its universities that together can be mobilised to realise the potential and meet the challenges?
- What steps need to be taken to move towards desired scenarios, for example of green growth?

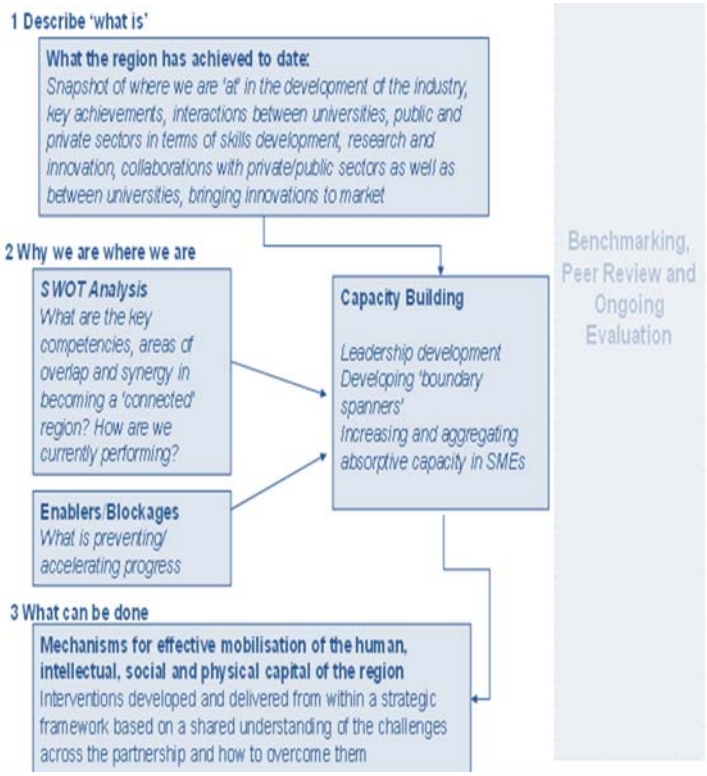

Figure 7.4 Developing a regional learning system

While such an approach will be familiar to public authorities responsible for territorial development it may well be new ground for universities. Their participation in the process alongside the public and private sectors will enhance their understanding of the regional drivers and facilitate the mobilisation of their intellectual resources to shape the future of the region and monitor and evaluate progress against international benchmarks.

This initial exercise should then inform a SWOT analysis of the connectedness of the universities to the region which specifically identifies the drivers and barriers to greater connectivity. From this explanatory analysis, interventions can be designed to increase the capacity of regional business to take advantage of the expertise of HE (for example through graduate placements in SMEs).

CASE STUDY – AVEIRO REGION, PORTUGAL

The University of Aveiro and the association of the eleven municipalities of the region, with about 375, 000 inhabitants, decided to take a bold step by traditional standards: they established a partnership for the design of a regional development programme, going beyond the role of piecemeal consultancy work and aiming at a joint approach to regional development. In fact, rather than hiring a group of academics as consultants, this initiative had a dual aim. The first was to mobilise the diversity of disciplinary knowledge existing in the university to help address the problems and expectations of the different municipalities and the regional community as a whole; the second was to set in motion the process of creating a shared understanding of regional development dynamics and challenges, which indeed could and should lead to a re-interpretation of needs and expectations.

7.4 Selecting, designing and assessing interventions

Earlier sections of the Guide introduced a number of mechanisms which can connect universities to regional development and Section 6 identified some of the barriers to their effective implementation. As part of the process of building capacity to work together, the partners will need to selectively fund mechanisms that strengthen the connectivity of universities **in** the region **to** the region. In areas of weak connectivity, characteristically the Less Favoured Regions, it may be necessary to start with less complex, transactional and time limited projects which help build capacity before moving on to more complex and potentially transformational programmes which have longer term outcomes and fewer immediate and easily measurable outputs such as new business starts. Nevertheless the Regional Learning Group (HE) will need to ensure that initiatives that are funded address any structural obstacles that may be embedded in the strategies, policies and practises of a university before supporting a particular activity such as subsidised university consultancy or investment in a laboratory /science park. Put another way, the **conditions** for effective regional impact must already be in place or part of the funded programme of activity.

Summary of mechanisms

The following table reviews the mechanisms described in the earlier sections in terms of the conditions likely to influence their effectiveness starting from the transactional and moving to the more transformational. The Table does not directly refer to the basic teaching and research activities of the university as the mechanisms described have to be embedded in (and change) these core activities. However if the academic profile of the university (subject area) reveals key knowledge domains relevant to the particular specialisms of the region then it may be necessary for the regional authorities to invest in selected academic positions and infrastructure such as laboratories 'upstream' but with the proviso that the appropriate university policies and practises surrounding these investments are in place.

Mechanism	Most effective when	Least effective when
1. Less complex, tend to be transactional and timebound with clear outcomes		
Consultancy services	High levels of demand among local businesses, ability to absorb and understand research, clear access points to request university expertise, strong links between university research specialisms and local industry focus	Local businesses have limited absorptive capacity, unclear access points, inflexibility and lack of understanding between the private sector and universities
Student Volunteering and Community Work	There is an understanding of the power of 'living laboratories' in driving social innovation, makes linkages to local private sector solutions to societal challenges, engages local communities effectively which leads to increased demand for teaching and research, makes links between academic research within the university and public policy and practice	Designed primarily to enhance the student experience, local communities are guinea pigs rather than active participants, no mechanisms for follow up once the project is finished, poor links to the academic research base
Graduate enterprise programmes	Programmes have good links to 'mainstream' business support in the region so there is a clear 'move on' strategy for graduate businesses, graduates are encouraged to consider businesses which link back to teaching and research strengths of the university	Businesses started are low growth, 'lifestyle' businesses with little added value, they cause displacement and distortion effects on existing regional businesses, there is no alignment between the university programme and local/regional business birth strategies
2. More complex, outcomes are longer terms and less tangible		
Staff spin outs	Universities incentivise and support staff to spin businesses out, regulations around ownership of IP are not onerous, spin out companies are in technology areas where there is already a regional critical mass of companies and expertise	Universities see spin outs as a threat and high risk activity, academics are preoccupied with teaching and research, regional industrial clusters do not map onto university research specialisms
Workforce Development	Responds to current and future employer demand in terms of achieving 'smart' regional specialisation and innovation strategies, mechanisms are in place to encourage private sector engagement in programme design and delivery, university staff are well connected to local employers and local businesses can easily engage with universities, links with further education and vocational programmes	Emphasis is on delivering off-the-shelf rather than bespoke training, driven by the needs of large employers rather than SMEs, lack of sustainability in delivery models when public funding ends, driven by national rather than regional objectives, inflexible models for course accreditation

Staff Mobility	Synergy and overlaps exist between university research and private sector R&D programmes, university policies encourage and reward collaboration, secondments and other vocational activities	Research overlaps are with companies outside the region, policies and procedures act as a barrier, universities are overly protective of perceived 'IP'
Widening Student Participation	There is a clear focus on driving a local skills development, talent and potential is defined in a broader sense	There is intense competition among universities to attract the 'best' students, league table positions are seen as critical, academic achievement is valued above local impact
Exploitation of IP	Universities have an open innovation policy, there are good collaborative links with local firms especially in areas of future growth	IP is jealously guarded and is expected to become a 'cash cow' for the institution, there is a focus on working with the best companies regardless of their location, quantitative measurements (e.g. patent applications) are more important than outcomes
3. Highly complex activities with potential for transformational change		
Research and Technology Centres	There is a strong link between regional and national innovation policy, objectives and activities, the centres exploit the innovation assets of the region while acting as a channel for national and international linkages, funding strategies are long term	The triple helix partnership is weak or disconnected, national and regional policies are not aligned, short term funding cycles and uncertainty about future public investment drive centres to work with the private sector on 'near to market' technologies rather than seeking to work with universities further down stream on new technologies
Network and Cluster Development	Genuine relationships already exist between the university and businesses in a particular sector or industry, the university seeks to 'add value' to the network through its research or teaching expertise, there are people in the university and private sector who can understand each other	They are predicated on a strategy of 'picking winners', there is little perceived added value from membership, it is seen as a 'talking shop' or becomes dominated by the agendas of a few companies or individuals
International Linkages	Universities research strengths and academic profile internationally acts as a 'hook' for inward investment and helps tie companies down in the region, universities work with the public and private sectors in showcasing the region around the world	Research is conducted in isolation from regional development strategies, there are no joint working agreements in place within the 'triple helix', links with companies and researchers outside the region are only pursued for the objective of academic excellence
Talent Attraction and Retention	The university has a national or international reputation for excellence in teaching which attracts students from other regions and countries, there is a strong and specialised industrial base for graduates to move into, there are minimal constraints on graduates taking up employment in the region (e.g. visa restrictions etc.), university specialisms make the region an attractive place for world class students and academics to come to	The university does not exploit its alumni network to connect talented people to businesses in the region, the core mission of the university is to ensure optimal job outcomes for its students regardless of the location of opportunities, universities in the region lack distinction in the disciplines that are most needed for the regional economy to develop
Cultural Development and 'Placemaking'	Investments in buildings, activities and other infrastructure by universities help to foster a creative and cultural 'buzz' which makes the region attractive to other talented individuals	The region is perceived as a cultural 'desert', or one where intellectual and cultural pursuits are only for the benefit of the 'elite', cultural buildings and activities are difficult to access by outsiders and there is little diffusion of benefits into local society

Table 7.5 Summary of mechanisms

7.5 Ex ante evaluation of impact

Table 7.5 can be seen as a way of assessing and understanding the individual interventions and how and when they might work. The questions below will help the Regional Learning Group (HE) to assess the extent to which they are achieving the 'higher level' strategic objectives of mobilising the university and overcoming barriers to effective engagement.

Fundamental to this approach is the building of formative and ongoing evaluation which encourages and enables partners to make adjustments to mechanisms while they are being deployed. The evaluations should therefore be dynamic and ongoing, embedded within the process and not just *ex-post.* Key questions to answer about each intervention might include;

- Will it create new or strengthen existing mechanisms for cooperation between businesses (through networks and clusters), sectors and universities
- Will research/technology resources and infrastructure be used to more effect?
- Will synergies and coherence between projects, programmes and policies improve?
- Will it improve conditions for entrepreneurship, incubation, spin out and spin off?
- Will it enhance human capital in the region, either through encouraging mobility of professionals across the innovation domains, skills development or the attraction and retention of skilled migrants to the region?
- Will it simplify pathways for industry to access innovation assets in the universities?
- Will access to finance and investment be improved?
- Will additional investment be attracted to the region?
- How will projects and programmes support the region to address societal challenges?
- Will there be increased cooperation between universities and businesses in the region, especially with indigenous SMEs?
- Will it ensure clear champions emerge within each of the partners?

These are tough questions and delivering projects and programmes that provide affirmative answers to them requires people who can span the world of HE, business and public authorities. Developing such **boundary spanners** can be achieved by selecting individuals from all three sectors who are contributing to the any of the transformational and complex projects described in Section 3 and developing their skills through action learning. This action learning should form part of a Place Based Leadership Development Programme overseen by the Programme Monitoring Committee - and linked to the Smart Specialisation Platform to ensure the sharing of experience across Europe.

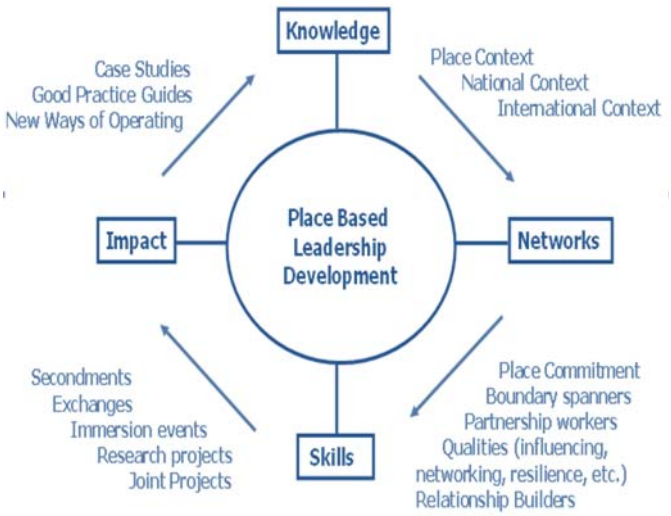

Figure 7.6 Model for a place based leadership programme

Figure 7.6, derived from the work of the UK's Leadership Foundation for Higher Education, describes a possible **Place Based Leadership Development Programme** which regions may wish to adopt. Under such a programme regions and their university partners would identify a transformational programme they have invested in and select key actors from inside and outside of HE charged with delivery of the programme. Leadership development would be through each actor bringing

substantive knowledge ('know what'), networks ('know who') and skills ('know how') to the initiative and explicitly sharing these with the programme team. A facilitator then ensures the sharing process and the enhancement of the skills of the individual, particularly their ability to take back their learning into the university, the public sector and the private sector.

THE WAY FORWARD: UNIVERSITIES AND SMART, SUSTAINABLE AND INCLUSIVE REGIONAL GROWTH

This Guide has indicated a direction of travel for universities and regional authorities wishing to work together. Each region and each university will be at different points on what will hopefully be a journey of discovery of what they can offer each other in steadily strengthening partnerships. Experts working within the university can play a key role by providing intellectual leadership that can point to the direction of travel in terms of smart, sustainable and inclusive growth strategies to which their institution can formally contribute through transformational programmes that draw on the university's teaching as well as its research and outreach work.

In terms of sustainable growth, universities as regional anchor institutions will need to pay attention to their own carbon footprint but also mobilise a wide range of disciplines to inform the policies and practices of regional businesses, public authorities and households. Similarly, inclusivity will involve the university opening out all its programmes to excluded social groups and fostering a culture of lifelong learning in the region

The regionally engaged university can bring this diverse activity together by corporately responding to major EU societal challenges and in this way act as a bridge between the global and the local. Tackling these challenges will involve working with business and the regional community in the co-production of knowledge in living laboratories that foster social as well as business innovation and plugging into European policies regarding, for example, the digital and green agendas, entrepreneurship and social innovation. But to realise this potential to change the world outside of academia, universities will need to develop themselves as learning organisations by investing in their own human capital, particularly in those performing a boundary-spanning role.

Furthermore, enhancing the universities' capacity to reach out to regional business and the community will fail if sufficient capacity for innovation is not in place within the region. This will be a particular challenge in some less favoured regions where investment in the capacity of business, community organisations and public authorities to reach into universities will be required. This may involve regional public authorities encouraging co-operation between different actors in the higher education sector (universities, polytechnics, research and special purpose institutions, community colleges) to establish an appropriate division of labour that plays to the strength of each.

To realise this potential will require regional agencies to think in terms of building a regional higher education system that is part of a broadly based ecology of innovation. Building links in these systems will be as important as strengthening the individual nodes like universities. At a very practical level the universities should be actively involved in shaping and managing the implementation of regional smart specialisation strategies.

In order to achieve this, the following actions are recommended:

- There should be an active attempt to a shift from 'transactional' to 'transformational' interventions with a greater emphasis on programmes rather than one-off discrete projects.
- A partnership is established in the region to specifically address the issues of engagement between universities and regions and particular attention is given to ensuring the sustainability of partnerships in the longer term, independently of funding cycles.
- Managing Authorities should assign funds from their technical assistance budgets to support capacity building within the partnership. Universities, business communities and other public sector authorities should demonstrate their commitment to the process by investing in their own development.
- Regional Partnerships should consider participating in the OECD programme of regional reviews in order to help identify their current strengths and areas that may require capacity building and consider carefully the findings of EUIMA and other related programmes.
- Some simplification and flexibility in implementing Cohesion Policy Regulations is considered and Managing Authorities are actively encouraged to adopt a more flexible approach.
- Managing Authorities and Universities adopt a broader definition of innovation to acknowledge the role that arts, humanities and social sciences can play, especially in responding to the 'grand challenges' and develop mechanisms that draw on the expertise and contribution from the arts, creative industries etc.

Case Study 1

Karlstad University in the Swedish Region of Värmland

Stimulating innovation and cooperation through network and cluster development

About Värmland

The Swedish region Värmland is three hours drive to the west of Stockholm and to the east of Oslo. The region has a population of 273,000 and the capital city Karlstad a population of 85,000. The region is undergoing long term structural change from an old economy based on timber, steel and paper manufacturing and engineering workshops to an economy based on innovation, IT, knowledge and services. Nevertheless, the importance of manufacturing industry to the region is still significant. Promoting innovation in both manufacturing and service sectors is a pertinent agenda. The Swedish innovation system has been internationalising with many of the big companies being part of multinational companies. This provides a challenge for the development of the regional economy in terms of engaging different interests and nature of 'local' companies, including both multinationals and local small and medium enterprises (SMEs).

Recognition of the need for structural change and the renewal of the economies in the region resulted in a political agreement among the municipalities in 2001 which established a joint regional authority to promote development in the fields of environment, infrastructure, industry and commerce, education, healthcare and culture. The newly created regional authority recognised an opportunity for a new approach to regional development and decided to concentrate its support on cluster development.

About Karlstad University

Karlstad University is one of the youngest universities in Sweden. gaining university status in 1999. It has 12,000 students and 1,000 staff. According to its prospectus, Karlstad University seeks to contribute to the development of knowledge both at the international, regional and individual level. To achieve this teaching and research is underpinned by a close dialogue with private companies and public organisations. Karlstad has an explicit aim - "to become one of the best universities in Europe with regard to external cooperation" (source website - PUT IN LINK)

The University has strong connections in its research and teaching with regional innovation business clusters. This is reflected in many dual professorial appointments funded jointly by the region and the University, research funding partnerships, professional up-skilling programmes, degree programmes including work-based learning, and close matching of university courses with regional needs.

The University continues to develop research centres and research with the capacity to enhance innovation as part of the "modern university". Among others, one of the most notable is the Service Research Centre (CTF) – one of the world's leading interdisciplinary research centres focusing on service management and value creation through service. CTF, has, for example, over 50 researchers drawn from business administration, working-life science, sociology and psychology.

Systematic Leadership and Innovative Management - SLIM II

SLIM II was launched in 2009 with total funding of €2.1 million, of which €1.05 million ERDF. It promoted existing co-operation and looked for ways to expand it. A total of 700 companies (with 60,000 employees) in 15 clusters participated in SLIM II. The clusters covered sectors from ITC and services sectors to strong traditional industrial sectors like steel and engineering and pulp and paper. Two examples, 'The Paper Province' and 'Compare' are presented in the boxes below.

Compare

Compare, which stands for Competence Area, conducts business and competence development within IT and telecom (ICT). It was founded in 2000 by 7 IT companies. An example of what can be created by cooperation between the Compare companies, the University of Karlstad and the local authority is the establishment of Compare Test lab, a high-tech centre for the independent testing of software. By 2010 Compare had grown its membership to 105 companies in, representing around 80% of the IT companies in the area. The organisation now has a staff complement of 8 employees

The Paper Province

The Paper Province coordinates and develops cooperation between the players in the paper and pulp industry in Värmland, the northern part of Dalsland and the County of Örebro. It was started as a local project by 7 companies in 1999 and became a business association in 2003. In 2007 it was recognised as one of the top EU Cluster in High Innovation Regions. By 2010 it had grown to 98 member companies (1,7 billion EUR in total turnover). It has a staff of 8 employees and a turnover of 0,8 Million EUR (2009).

The cluster companies were encouraged to intensify and widen their networking. The project created contacts with the companies across the clusters and looked for new companies to join. The project also linked the clusters and universities. This was important as many entrepreneurs were not used to approaching researchers while the universities were focussed on their scientific priorities. SLIM II brought the actors together face-to-face and built acquaintance and mutual trust. Joint projects with the clusters involved 3,000 students and 590 companies.

A cluster room was established at the Karlstad University to facilitate meetings between SMEs in the clusters and students and researchers at the University. This was to lower the barriers to work with the academic world. It targets the entrepreneurs who were not familiar with the university environment. A total of 182 meetings were organised involving 260 researchers, 420 students and 225 company representatives. Many other events (around 950), e.g., breakfast/lunch meetings, guest lectures, business meeting events as well as projects and study visits were arranged.

Researchers and students were offered the opportunity to do research on real cases in companies, potentially leading to work opportunities. The university also developed shared views with the clusters on research needs which fed through to innovations in companies and subsequently the regional economies.

The project created new contacts and increased mutual trust and social capital between different actors. It provided ideas for joint cross-sector activities between the cluster companies and the university faculties. The project greatly benefitted the Karlstad University which has become an important player in the development of

the region. As a concrete outcome, the University of Karlstad established a Research Institute of Innovative Leadership (RIIL) independently of the project to provide research knowledge to companies in the region.
The companies reported in general an increase of 30% in sales, an increase of 50% in co-operation with the university and 35% with other companies as well as a 15%increase in employment (around 1,800 new jobs in companies in the 12 clusters). 80% of the companies in the Clusters stated that they aimed to grow and 70% believed that participation in the clusters to lead new products and services.

The project also created a significant change of attitude within the university, with much greater interest now shown by researchers and students in cluster and regional development. The university is now looking also outwards instead of focusing only on scientific ambitions. The change of attitude was evidenced in a study conducted jointly by the university and external consultants in 2010.

Enablers

- An acknowledgement by the University that regional engagement can enhance the core missions of teaching and research (*e.g.* the region as a laboratory, a provider of work experience for students and a provider of financial resources to enhance global competitiveness). This enhanced development of mechanisms to link teaching, research and third task activities that cut across disciplinary boundaries.
- The fact that Region Värmland's strategy has explicitly been to strengthen collaboration within and between key regional actor organisations and the University in the context of the region's competitive strengths. This has been achieved by establishing the appropriate and agreed regional and university infrastructure.
- Reaching a critical mass of companies proved to be precondition for effective cluster development. This project showed a need to involve the emerging enterprises and services in the clusters, recognising that involving services is more difficult than manufacturing companies, where their position in the production chain is easier to identify.

Barriers

- Changing academic culture
- Integrated human resource development strategy across all sectors
- Ensuring consistency between National policy in regional development and higher education and Region Värmland's approach based on innovation, human capability, dialogue and collaboration, internationalisation and university/ region engagement.
- Understanding that co-operation processes cannot be directly transferred to other regions, but need to be adapted to the prevailing circumstances, which requires in-depth understanding of the regional contexts (and high levels of regional intelligence).

Sources:

- Presentation to EUIMA conference May 2011
- PASCAL Report to the Värmland Region PURE Work in 2009-2010
- SLIM 2 Final report
- 'Made in Sweden; Cluster cooperation in Northern Central Sweden' Assessments 2009
- http://www.varmland.se/en/about-varmland/varmland-innovation-system

Case Study 2

Newcastle University in the North East of England

Helping to stimulate economic revival by building relationships between a research-intensive university and strengthening an established industrial production complex – the process industries – and building a new complex based upon historic regional assets – new and renewable energy.

About North East England

The North East is the smallest of England's nine administrative regions in terms of population (2.6 million) and, with the exception of London, is the smallest geographically (8,592 square km). The region's economic history over the past 100 years has been mainly characterized by decline from an industrial powerhouse, with thriving coal mining and shipbuilding industries, into a lagging region with high unemployment and declining productivity relative to the UK average.

Over recent years, through targeted interventions, the North East has capitalised on its engineering and manufacturing heritage, has restructured its economic profile and moved towards a more diverse and competitive economy. with world class capability and assets stimulating growth of emerging sectors including low carbon, renewable energy, plastic electronics and industrial biotechnology.

This has largely been driven by the establishment in 1999 of the Regional Development Agency (RDA) One North East, which had a remit to further the economic development and the regeneration of the region by promoting business efficiency, investment and competitiveness, creating employment and encouraging and enhancing the relevant work skills in the population. One North East increasingly saw universities as playing a key role in this mission, and this was explicitly articulated in the Regional Economic Strategy for the North East, which sought to place 'universities and colleges at the heart of the region's economy'.

In 2010 the new coalition government announced their intention to abolish the RDAs in England (with the exception of London), and replace them with local enterprise partnerships. Responsibility for funds such as ERDF which had previously been administered regionally will transfer to central government.

About Newcastle University

Newcastle University was born out of the need to support the newly emerging industries of the 19th Century and to sustain a healthy population to work in those industries, with departments focusing on various areas of engineering – marine, electrical, civil and chemical, together with agriculture and medicine. The establishment of the independent University of Newcastle upon Tyne in 1963 was followed by a significant expansion of higher education in the UK. In Newcastle, this expansion coincided with a major programme of urban redevelopment, part of a national attempt to revive the flagging economy of the North East. An alliance between the then deputy vice chancellor and the civic leadership resulted in the consolidation of the present campus as part of a vision of "Education upon Tyne", a vision which anticipated later notions of the knowledge or service based city. In physical terms, it embraced the polytechnic, Civic Centre, University and Royal Victoria Infirmary sites. As a result, unlike many other civic universities, Newcastle was able to expand in situ and develop a single-site city centre campus. Newcastle strives to be a world-class research-intensive university, to deliver teaching and facilitate learning of the highest quality and to play a leading role in the economic, social and cultural development of the North East of England. The vision is of Newcastle as a 'civic university' - one with a global reputation for academic excellence but responsive to helping the city and region overcome the societal challenges of the 21st Century.

The 'Strategy for Success'

The establishment of the North East agency (ONE North East) fundamentally changed the terms of engagement for the region's universities. Its first Regional Economic Strategy recognised the need to rebuild the economy around knowledge based industries, and consequently "placed universities at the heart of the regional economy". This exhortation was translated into a "Strategy for Success" hubbed around five "centres of excellence" designated to operate between business and the research base in the universities. These were focused on areas where there was proven research strength in universities and identified industrial opportunities, alongside investment funds to assist in catalysing new ventures and growth of existing small to medium sized businesses. These included a New and Renewable Energy Centre (Narec) based at the Port of Blyth where there had already been some public investment in testing facilities for on-shore and off-shore wind, a Centre for Process Innovation (CPI) based on the former ICI research site at Wilton on Teesside, and a Centre for Emerging Nanotechnology Micro and Photonics Systems which was subsequently incorporated into CPI. While there were some research strengths in Newcastle University, these were spread across several schools; in contrast its strongest and most focussed areas in terms of established research institutes were in the medical sciences where the region lacked an indigenous industrial base. However the RDA did decide to invest in this area in and close to the University and teaching hospital within the City of Newcastle itself, with a view to establishing a new industrial base through spin-outs and the attraction of inward investment. The decision to establish intermediate organisations with their own facilities outside of the University and the city was sector specific and related to the degree of research focus within the University relevant to these areas.

CPI The initial remit for CPI was as a translational vehicle. The objective was to create technology platforms so that the sector skills, knowledge and expertise of industry and academia could come together in collaborative projects. As far as the regional universities are concerned, it was recognised that Newcastle was exceptionally strong in chemical engineering but not in chemistry, where the main academic excellence in the region was in Durham University. To enhance Newcastle's strengths in chemistry, CPI used funds from the RDA to enable the Newcastle University to appoint a senior academic into its School of Chemical Engineering and Advanced Materials to develop the skill set around industrial bio-technology and catalysis, areas highly relevant to the technical changes underway in industry on Teesside. Likewise RDA investment in facilities in the School of Electrical, Electronic and Computer Engineering enabled it underpin CPI work in plastic electronics. So there was upstream investment in the science base.

Narec If the establishment of CPI could be seen as a defensive investment designed to secure the future of the established chemical and process industry in the region, Narec was an offensive investment seeking to build a new industrial sector. Narec brands itself as "the national centre for the UK dedicated to achieving the development, demonstration, deployment and grid integration of renewable energy and low carbon generation technologies". It covers wind energy, marine renewable, electrical networks and distributed energy. Narec's business model involves identifying individual academics, finding out what they are doing that is of interest to the centre and its customers, and what capacity is has to offer them. One area of Narec's activities is to run seminars, workshops and conferences and supply chain events to make companies aware of the opportunities in the centre. Academics from the region's universities contribute to these events, which are often highly focussed on particular areas. So an event on tidal device blades might bring in experts on materials, the water column and water flow. Narec then brings business development expertise to the events. The University has endeavoured to pool its expertise to provide a better interface to Narec. It has established the Sir Joseph Swann Centre for Energy Research with a mission to provide an intellectual lead in the pursuit of the low-carbon economy of the future, by developing new technologies that reconcile human needs for energy conversion and use with social and ecological needs.

Enablers

A restructuring of Newcastle University in 2001 was undertaken to create a stronger steering core designed to enable the university respond corporately to external opportunities in terms of engagement with business and the public authorities. A Deputy Vice Chancellor was given specific responsibility for city and regional engagement embracing both teaching and research including the academic services which support this activity.

Both Narec and CPI were established by ONE North East as private not for profit companies with regional innovation objectives written into their memorandum and articles of association. The company boards included university members in their individual capacity and CEOs with private sector research leadership appointed.

Over the period 2002-7 the RDA invested tens of millions of pounds in CPI and Narec. This was made up of core running costs and project funding, chiefly for the installation of specialist equipment. With this scale of budget, the centres were able to employ specialists who could not be afforded or rewarded appropriately by a university technology transfer office which by definition had responsibility for the commercialisation of the whole spectrum of university research. The Centres were also able to acquire equipment that could neither be afforded nor accommodated on campus.

Barriers

In creating CPI and Narec the RDA recognised the need to establish them as institutions in their own right and having an economic impact as a consequence of that – as anchor institution in their own localities. While building links between business and regional universities was part of the original rationale for the centres the metrics to measure the extent and significance of the contribution of the universities via the centres to regional innovation have proved problematic. The centres had to fit into a nationally determined model of regional outputs such as job created, which were laid upon all RDAs by central government in part to meet state aid rules, which were tangential to the core mission of the University.

Sources:

- Newcastle University (2009). Vision 2021 – A World Class Civic University
- ONE NorthEast. (1999) Unlocking our Potential: the Regional Economic Strategy for the North East.
- Goddard J., Robertson D. and Vallance P. (2012). 'Universities, Technology and Innovation Centres and Regional Development: A Critical Review'. Cambridge Journal of Economics. (Special Issue: Universities and the Knowledge Economy) (forthcoming)
- www.narec.co.uk
- http://www.uk-cpi.com/

Case Study 3

University Rovira i Virgili in the Spanish Province of Tarragona

A model of university-industry collaboration around research-based human capital development in the chemical industry.

About Tarragona

Tarragona is a province of eastern Spain, in the southern part of the autonomous community of Catalonia. It has a population of 888,895 (2008), of whom about one-fifth live in the capital Tarragona. The province has 183 municipalities. The Tarragona petrochemical industry is considered the most important chemical hub in southern Europe and the Mediterranean area. It represents 25% of the Spanish chemical industry and generates 44% of all plastics produced in Spain. It is home to around 30 companies in the industry, who employ some 10,000 people directly and 30,000 indirectly, utilising more than one million square metres of dedicated industrial space.

Catalonia's various sub-regional levels are taking different initiatives to support innovation in a broad sense, seizing opportunities from Spanish and Catalan policy. The tools most commonly used are incubators and science or technology parks. Higher education institutions are often the leaders in these local initiatives and some adopt a highly proactive approach. One of the most notable examples from the region is the University Rovira i Virgili.

About the University Rovira i Virgili (URV)

URV is a public university founded in 1992 from previously existing university faculties and schools. It offers 52 programmes of study across the different disciplines to over 12,000 students. In terms of its research strengths, URV had EUR 17 million in research grants from different sources in each of the last several years (approximately 10% of URV revenues), including grants from leading EU, Spanish and Catalan programmes. URV also stands out for its high level of citations in Spain, particularly in its centres for Chemistry (fifth), Clinical Medicine (second) and Engineering (fourth).

The vision of the university is to constitute an international pole of knowledge that, from its strategic position at the meeting of the Mediterranean arch and the Ebro valley and its specialisation in a set of scientific fields, contributes decisively to the involvement of Catalonia and Spain in the cultural, social and economical development of the world, more specifically:

- To improve regional organisation and widen participation in higher education
- To encourage critical thought, freedom and pluralism
- To provide life-long quality education and training
- To generate growth
- To promote responsible and sustainable human development in southern Catalonia, through independent research and the transmission and application of knowledge
- To emphasise the universality of knowledge and internationalisation

The University has also taken the lead in a strategic initiative to support innovation through its Tarragona Region of Knowledge Office, which has within its main objectives to support fundraising for innovation and R&D projects in companies and to promote territorial strategic projects for companies and for institutions. A Socioeconomic Committee led by URV and including many other regional stakeholders (employers, unions, chambers of commerce, and the Port of Tarragona) has put together a strategic plan for the area that takes into account the latest approaches to the importance of a territory for effectively supporting an innovation system. URV is also active in supporting knowledge clusters in the Tarragona province through its teaching, research centres, science and technology parks, and other institutions. Those clusters include: chemistry and energy; nutrition and health; heritage and culture; tourism and leisure; and oenology. Investment in the related science and technology parks has totalled EUR 39 million.

University/industry collaboration projects

URV operates under the Spanish higher education legislation which regulates universities' governance, recruitment system and salaries. Despite these constraints, the university has been able to develop several mechanisms to mobilise itself for regional development.

In meeting its vision and mission, the university has set specific milestones in the development of scientific policy. It has a strategic research plan, a strategic teaching plan, a postgraduate policy and teaching-research alignment, and strategic plans for third mission and internationalisation.

There is joint strategic planning with regional economic actors, including trade unions (UGT, CCOO and Unió de Pagesos); employers' associations (Foment del Treball (CEPTA) and PIMEC (SMEs)); chambers of commerce (Tarragona, Reus and Valls); and the Port of Tarragona.

The Campus of International Excellence Southern Catalonia (CEICS) represents the strategic union of different organizations and structures involved in teaching, research, knowledge transfer and the productive sector in southern Catalonia. The driving force behind this group is Rovira i Virgili University. The CEICS organizes its activity in five specialized sub-campuses: Chemistry and Energy, Nutrition and Health, Tourism and Leisure, Heritage and Culture, and Oenology

Campus of International Excellence Southern Catalonia – CEICS (Tarragona)

The Universitat Rovira i Virgili played a leading role in the Campus of International Excellence Southern Catalonia (CEICS) initiative, which was subsequently awarded the status of European Campus of International Excellence by the Spanish Government. The CEICS is a collaboration between a group of knowledge agents and the administrative, industrial and business sectors from the southern region of Catalonia and aims to create an international hub for the promotion of the knowledge society and economy. To do so, it aims to promote excellence in teaching, research and knowledge transfer in conjunction with the principal manufacturing sectors and through the establishment of international agreements.

In particular URV has established a long-term co-operative relationship with the chemical industry in Tarragona that incorporates both research and human capital development programmes that are relevant to the industry needs. Faculty are allowed to spend time working in local firms during their leave and have on-going relationships with the firms. There are strong alumni connections and students participate in internships and coop programmes within the local firms. Both advanced technical vocational skills and higher degree based skills such as in engineering are designed in co-operation with the local industry representatives.

Enablers

The R&A (research and academic) Staff Commitment Agreement takes the form of an instrument for human resource management and a key element in the strategy for improving the university's quality. It focuses on improving the overall process of planning and management of R&A Staff activities. The development of the commitment agreement includes planning, monitoring and ending phases.

The R&A Staff Commitment Agreement is designed to steer faculty and administrative efforts toward the achievement of mutually accepted individual, departmental, school and university goals and objectives, according to the mission of the university. The agreement also emphasises the collective character of the overall task of a department; teaching, research, transfer of knowledge and service and administration. The agreement explicitly allows for professors with different profiles to reach their full potential based on their individual skills and by working with their colleagues and in accordance with the mission of the department and the university.

The agreement is an online document that brings together all the activities developed by the R&A Staff and allows the university to maintain a current and permanent record of its activities, structured around five areas:

- Teaching
- Research
- Transfer of Knowledge & Technology
- Service & Academic administration
- Personal Development

Barriers

The university is changing from a closed system towards an open organization which needs to interact with private and publics institutions and with the society. This change is a big challenge for the system and requires some "top down" measures to organise and evaluate the management of collaborative research projects, such as collaborative research contracts; promoting interdisciplinary expertise (inter- and intra- universities/companies) and negotiating shared IP Rights.

Sources

- OECD review of regional innovation – Catalonia
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- Presentation to EUIMA Conference Tampere
- OECD Higher Education in Regional and City Development Catalonia, Spain 2010

Case Study 4

Combined Universities Cornwall and the English County of Cornwall

Developing Higher Education to drive smart specialisation in Cornwall and the Isles of Scilly

About Cornwall

Cornwall is situated in the far South West of England, some three hours from the nearest major city (Bristol) and four from London. With a rising population of 537,400 in mid-2010, Cornwall & the Isles of Scilly currently benefits from a major European investment through the Convergence Programme 2007-2013. This programme aims to transform the traditional rural economy of Cornwall and the Isles of Scilly into a high-growth and knowledge based economy.

The Cornish economy has been characterised by low levels of productivity and modest levels of growth over a number of years, although this differs somewhat between sectors. Overall however, the peripheral nature of the region and poor connectivity have often created an image of a good place to visit rather than a good place to do business. Not surprisingly, this has resulted in a seasonal dependency on low skilled jobs and a lack of high value and larger, international businesses.

Cornwall's strengths are that it is a region with an innovative small business community, having strong sectors in the creative industries, green technologies and services, agri food and ICT. The ongoing Convergence funding continues to improve productivity and increase the Gross Value Added through these growing knowledge based industries and by improving the business infrastructure through investment in transport and superfast broadband.

Following the demise of the old regional governance structures in England, Cornwall and the Isles of Scilly have been in the forefront of establishing a new business-led public-private Local Enterprise Partnership to provide strategic leadership in the areas of economic development and business growth. Although at an early stage, the plan is that this partnership will have an important role in influencing the shape of any future investment programmes for the region.

About the Combined Universities Cornwall

Combined Universities in Cornwall (CUC) is a partnership of six universities and colleges working together to give more people the chance to study in Cornwall, and to use university level education to help our businesses and communities to thrive. The partnership comprises two major national Universities, a specialist Arts institution and specialist Medical and Dental College, and two Colleges of Further Education. Each institution develops and delivers University-level education but, through the partnership, they are committed to co-operation to drive local economic development.

The original rationale for the investment in higher education capacity was to drive long-term cultural change in the region, to raise levels of skill and aspiration, and to retain more young people in the local economy. The CUC partnership was founded in 2000 and took advantage of EU investment through Objective 1 to grow taught higher education provision (3-year degrees and 2-year foundation degrees) from a very limited 2,500 full time equivalent places in 2000 to nearly 8,000 now. During that period, young people's progression from school to higher education has risen in the region faster than in the rest of the UK.

Investment in the Combined Universities in Cornwall has been one of just a few major strategic investments made by the structural funds programmes, along with infrastructure and fast broadband. The rate of growth of the

Cornish economy and specific indicators such as the rate of growth of knowledge-intensive industries have been a mark of the success both of the overall programme and of the CUC investment in particular.

Developing higher education and innovation commissioning frameworks for the Convergence Programme

At the start of the Convergence ERDF programme, there was clear commitment in the regional Operational Programme (OP) to focusing investment on transformational change and the growth of high-value business, through investment in four main areas: Innovation and R&D; Enterprise and Investment; Transformational Infrastructure; and Unlocking the Economic Potential of Place.

In Cornwall the Convergence ERDF programme operates on the basis of commissioning key strategic investments. Although a few of these were specified in the OP, in most areas further work was required to get from the aims set out in the OP to a set of delivery projects which would realise these aims. This provided an opportunity to consider, at strategic level, what investments should be commissioned to build further on the success of CUC in driving regional growth.

At the same time, the Convergence ESF programme, although working through a national Operational Programme, agreed a local Framework which included a substantial element of investment in higher education and higher level skills through CUC. The stage was therefore set for a complex piece of strategic analysis to work out where this investment, across both programmes, should best be applied.

A clear focus for innovation and research investment quickly emerged by considering together three key dimensions of this question:

- High growth, high value sectors in Cornwall with identified potential to grow and where knowledge and innovation have a part to play in driving this growth; and
- Areas of curriculum specialism which were either existing strengths of the partner institutions or which there was a realistic prospect, given investment, of developing and sustaining in Cornwall; and
- Areas in which complementary investment and assets would be made to reinforce the impact of Research and Innovation investment.

Linked Innovation and Research assets in Cornwall in the Environment and Sustainability

Higher Education research investments

- Environment and Sustainability Institute (ESI)
- Peninsula Research Institute for Marine Renewable Energy
- European Centre for Environment and Human Health

Related assets (actual, planned or sought)

- Wave Hub and Fabtest (national wave energy offshore testing facilities based in Cornwall)
- Tremough Innovation Centre (co-located with ESI)
- Marine Energy Park (part of a national initiative)
- Ecotown (testbed site for major sustainable housing development)
- Eden project

Skills and research development

- Foundation degree, undergraduate and postgraduate programmes in renewable energy
- Targeted collaborative research with business
- Targeted business support and graduate placement to develop renewable energy and low carbon business opportunities

We made progress on this through an iterative process of independent economic analysis, strategic planning and analysis by institutions and the higher education national funding council, consultation between the Convergence programme and Higher Education partners, and consultation with the local and national specialist business communities. What we were seeking was a few areas in which we could make a number of related investments that could generate significant critical mass, enabling Cornwall to achieve a leading position.

This led to the preparation of a "Higher Education Commissioning Framework" which specified, amongst other things, that HE investment should be focused in the thematic areas of the Environment and Sustainability, the Environment and Human Health, and the Creative (Digital and Design) sectors, and in underpinning this with a range of services and programmes to develop enterprise and innovation, funding for collaborative research studentships between HE partners and business, and an intensive scheme to place graduates in employment in local businesses. In each areas of specialism, investment was made not just in research facilities and staff but also in knowledge exchange workers – those who could proactively build links between the research base and local business. The inter-relationships between investments is illustrated below for just one of these areas, the Environment and Sustainability:

It is early days to report the outcomes of this investment as facilities are still being constructed and new staff being appointed. However, we have already for example attracted more than £30m in additional research funding investment, which is a promising beginning.

Enablers

- Diversity of CUC partnership bringing together world-class research, strong industry links, innovation expertise and vocational skills provision to provide a well-rounded approach
- Early acceptance by both Convergence programme partners and HE that the strategy of focused investment in a few major themed areas was the right one, and a relatively swift and uncontroversial agreement of what those area should in principle be
- Leadership by the Convergence partnership, Cornwall Council and the emerging Local Enterprise Partnership, and the support of the former Regional Development Agency and the national Higher Education Funding Council, all of whom understood and bought into the vision of using higher education as a key driver of growth

Barriers

- Lack of strong existing expert business base in several target areas increased risk and made a proper level of business consultation about some elements of the strategy difficult. This was particularly true in the case of the Environment and Human Health where our strategy was to gain early-mover advantage in this emerging new field
- Radical change to programme governance structures since 2010 has threatened some discontinuity, particularly to our ability to bring ESF higher level skills investment to the table in the way originally intended by the programme. Loss of Regional Development Agency creates a need to grow local capacity to drive this and any future programmes
- For institutions, the recent major shift in UK government funding of mainstream higher education – away from institutional grant-aid and towards a system of government-backed student loans – has utterly changed the financial and business models that apply to the universities' when viewed as very large social enterprises. This again increases risk, but also by increasing national pressure on institutions to widen HE participation and achieve good employment rates for students, in part strengthens the alignment of institutional priorities with the economic priorities of European regional development programmes.

Prepared by Sue Brownlow CUC with support from Rebekah Hood, Cornwall Council.

Case Study 5

Krakow University and Malopolska Region in Poland

Building on the research and teaching strengths of the University to attract inward investment and stimulate indigenous enterprise in a growing sector

About Malopolska

Malopolska is located in the south-eastern part of Poland and is bordered by Slovakia to the south. The regional capital and largest city is Krakow. The Malopolska economy is one of the most diversified of Poland's regions. The employment rate is above the national average and the unemployment rate is one of the lowest in the country, though youth unemployment is an issue as in the rest of Poland.

Malopolska has above average employment in agriculture (23% in 2006). Employment in industry is around the national average, the most important industries being traditional heavy industries, including steel, heavy chemical, mining and metal industries, though a number of new industries are emerging, including industries associated with the information economy – cable, telecommunications, computing and pharmaceuticals. In its Regional Innovation Strategy Malopolska targets IT and ICT industries as potential growth areas. Malopolska is an observer member of IANIS+ (an information society network programme under the Innovative Actions of the Structural Funds.)

Krakow in particular has been very successful in using its historical strength as a centre of higher education to adapt to and enable new economic opportunities by attracting and retaining foreign investment to the region. The size of the graduate pool in a wide range of disciplines, particularly in the disciplines of computing science, accounting and management, make it an attractive destination for software and business process outsourcing companies. Over the past decade several large high-tech corporations have built a significant presence in Krakow, including IBM (finance and accounting services as well as software development), Google, Motorola and Sabre. The business processing outsourcing sector includes companies such as Cap Gemini, KPMG and Shell's Shared Service Centre. According to the Malopolska Regional Development Agency, Krakow has been ranked as second only to Warsaw in attractiveness to technology and outsourcing businesses.

However Malopolska has not just been successful at attracting overseas investment, but also fostering indigenous enterprise. One of the biggest software companies in the region is ComArch, founded in 1993 by professor Janusz Filipiak, a tenured scientist on leave from AGH University of Science and Technology. The company has gone on to build up an international network of subsidiaries which employs almost 3,500 people worldwide and has a turnover of more than $200m.

About AGH University of Science and Technology

AGH University of Science and Technology is the second largest technical university in Poland, located in Kraków. The university was established in 1919, and was formerly known as the University of Mining and Metallurgy. The University has almost 20,000 academic staff and over 35,000 full and part time students, of which more than 2,000 are postgraduates and over 750 are doctoral students. There are more than 2,000 staff involved in research activities, of which 500 are pursing independent research.

The university has an active portfolio of collaborations with a range of partners nationally and internationally. It has over 370 agreements of direct collaboration with partners in Europe, North and South America, and Asia and

over 100 agreements with research and scientific units in Poland. The university also proactively engages with the private sector, and has almost 250 agreements with industrial partners, including large international corporations.

Domestically AGH cooperates closely with other universities as well as public administration and local self-governing units. They participate in many domestic and international scientific and technological consortiums and platforms and joint organizational initiatives such as: research centres, centres for the development of technologies, intercollegiate laboratories, and others. One of the projects AGH is currently supporting is the Małopolska Cluster for Information Technologies, which is supporting by national and European funding.

Małopolska Cluster for Information Technologies

The cluster's mission is:

"Supporting the development of IT, through the creation of networks of enterprises, local authorities, universities and institutions of the business environment

The ICT sector is undoubtedly a potential source of job creation in the Malopolska Region. The various regional planning documents reaffirm the importance of fostering its development. For instance, the Regional Innovation Strategy has set itself the goal of "creating the conditions for development in the sector of information and communication technologies (ICTs) further upstream of industry and businesses". The Development Strategy for 2007-2013 targets increased investment in research into ICTs and application of innovative methods within the regional economy.

One of the mechanisms to achieve this is the Malopolska IT Cluster project is intended to make Malopolska the ICT hub for Central Europe and help create quality jobs in the region. The project was developed following the identification of weaknesses in the structure of the ICT sector and particularly the absence of links between research establishments and businesses. In July 2006, regional players in the sector decided to tackle this by creating a cluster whose main objective is to establish an "efficiency-enhancing, value-adding environment, facilitating collaborative research relationships, knowledge and technology transfer, raising competitiveness of existing IT companies and effective support for new IT investments, optimal distribution of public funds on boosting research and innovation, and, last but not least, securing the steady inflow of highly qualified manpower in the region."

The structure currently draws together 25 partners including companies like ComArch, Solidex and Ericpol Telecom, as well as institutional partners such as the Marshal of the Malopolska Region, the AGH University of Science and Technology, and the Jagiellonian University of Krakow.

The main goals Main goals of the project

- building a network of connections between companies related to The IT industry and universities teaching their future employees
- promoting cooperation between companies, universities and authorities in order to enhance the region's future competitiveness.
- preparing initiatives beneficial to further development of the IT business in Malopolska (especially in terms of small and medium enterprises)
- promoting Malopolska as a competitive European region.

Enablers

While the indicators for ICT ownership and usage in Poland as a whole lag behind most of Europe, Malopolska was at the forefront nationally of developing online public services and promoting technology uptake among municipal staff. As early as 2003 more than 80% of municipal staff had their own computer terminal. This early adoption in the public sector has led to a positive and proactive approach to ICT policy development.

The regional authorities of Malopolska have been both ambitious and consistent in the emphasis on ICT development in their strategic planning. The action programmes for 2000-2006 and 2007-2013 have given prominence to developing the 'information society' and also seek to tackle all the issues involved – infrastructure and equipment, fair access, private and public sector issues etc.

The public authorities have led the development of an inclusive approach to designing and implementing ICT policies, which has succeeded in getting many of the key public, private and higher education partners engaged in the process. The success of this approach is evidenced by the creation of the Council for the Information Society in Malopolska in April 2004 which has played a prominent role in ensuring the cohesion of the implementation of projects and programmes.

Barriers

The emphasis on building a strong regional partnership and consensus on the challenges and how to overcome them has meant that for the most part, the barriers to success have been external. The first is the relatively poor position of Poland as a whole when it comes to information society indicators, particularly in terms of private ownership of ICT equipment and broadband infrastructure. On many opt these measures Malopolska in general and Krakow in particular outperform the national indicators, however if Poland is perceived by potential investors as a 'low tech' society, this may have consequences for the ability of Malopolska to market itself as an ICT hub.

The other challenge is the competition from other growing regions of Poland and the rest of Europe and the wider world, particularly places with a large, cheaper and well educated labour supply. The global downturn has not only curtailed new investments, but also means companies are highly price conscious when it comes to locating their businesses. Service sector businesses such as software development and business processing outsourcing companies are far more mobile than 'traditional' capital intensive industries, and therefore cities and regions have to work hard to maintain their attractiveness, particularly to foreign firms who may lack the additional 'stickiness' of indigenous firms to their location.

Sources:

- IRIS Europe - Analysis of ICT policies in the Malopolska Region
- http://www.agh.edu.pl/en/university.html
- "Małopolska - the IT hub in Central Europe. The ways of supporting creation of quality jobs in the region" Office of the Marshal of the Małopolska Region – Kraków (Poland).
- Council for the Information Society in Malopolska

1. WHAT IS A REGION? DEFINITION AND CONCEPTS

Region (general definition)

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- **In geography, regions are areas broadly divided by:**
  - physical characteristics (physical geography),
  - human-impact characteristics (human geography), and
  - the interaction of humanity and the environment (environmental geography).
- **Geographic regions and sub-regions are mostly described by their imprecisely defined, and sometimes transitory boundaries, except in human geography, where jurisdiction areas such as national borders are clearly defined in law.**
- **A region has its own nature that could not be moved:**
  - The first nature is its natural environment (landform, climate, etc.).
  - The second nature is its physical elements complex that were built by people in the past.
  - The third nature is its socio-cultural context that could not be replaced by new immigrants.
- https://www.youtube.com/watch?v=Rwy7kRtH-ek

Regions in the EU

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- https://www.youtube.com/watch?v=a4Y-hCQ-Klo
- **geocode standard for referencing the sub-divisions of countries for statistical purposes.**
- **The NUTS (Nomenclature of Units for Territorial Statistics) classification is a hierarchical system for dividing up the economic territory of the EU for the purpose of:**
  - The collection, development and harmonisation of EU regional statistics.
  - Socio-economic analyses of the regions.
    - NUTS 1: major socio-economic regions
    - NUTS 2: basic regions for the application of regional policies
    - NUTS 3: small regions for specific diagnoses
  - Framing of EU regional policies
    - Regions eligible for aid from the Structural Funds (Objective 1) have been classified at NUTS 2 level.
    - Areas eligible under the other priority objectives have mainly been classified at NUTS 3 level.
    - The Cohesion report has so far mainly been prepared at NUTS 2 level.

NUTS

- The thresholds in the table below are used as guidelines for establishing the regions, but they are not applied rigidly. For example, both Åland, with a population of 27,734 in 2009, and Île de France, with a population of 11,797,021, are NUTS 2 regions.

Level	Minimum	Maximum
NUTS 1	3 million	7 million
NUTS 2	800,000	3 million
NUTS 3	150,000	800,000

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Countries		NUTS 1		NUTS 2		NUTS 3	
EU members	28		98		274		1324
Austria	AT	Groups of states	3	States	9	Groups of districts	35

LAUs

- There are three levels of NUTS defined, with two levels of local administrative units (LAUs) below.
- These were called NUTS levels 4 and 5 until July 2003, but were officially abolished by regulation, although they are sometimes still described as such.
- Note that not all countries have every level of division, depending on their size. One of the most extreme cases is Luxembourg, which has only LAUs; the three NUTS divisions each correspond to the entire country itself.

Countries		LAU 1		LAU 2	
EU members	**28**	**8,772**		**120,968**	
Austria	AT	— (same as NUTS 3: Groups of Districts)	35	Municipalities (*Gemeinden*)	2357

Regions in Georgia (1)

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Area: 69,700 km^2
Population: 4,012,104

Map ref.	Region	Population
1	Abkhazia	240,705
2	Samegrelo-Zemo Svaneti	331,145
3	Guria	113,000
4	Adjara	480,209
5	Racha-Lechkhumi and Kvemo Svaneti	31,927
6	Imereti	487,000
7	Samtskhe-Javakheti	160,262
8	Shida Kartli	264,633
9	Mtskheta-Mtianeti	94,370
10	Kvemo Kartli	423,986
11	Kakheti	319,144
12	Tbilisi	1,158,700

2. THEORETICAL BACKGROUND: COMPETITIVENESS OF CITIES/REGIONS

Backgrounds

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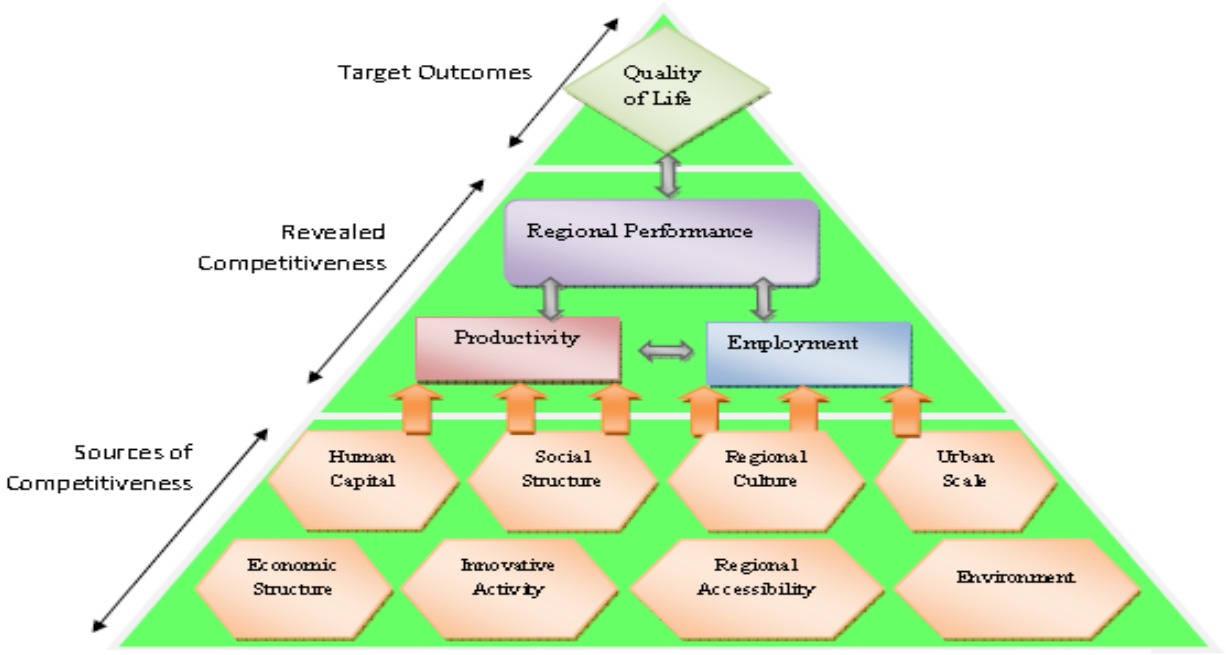
- **The present situation implies that some cities are more successful in their economic transformations than others:**
  - there are cities able to develop a more information-based, knowledge-driven environment that promotes economic growth and high innovation rates, attracts human resources and direct investments, and creates high-valuable jobs.
  - other cities have to cope with dramatic economic decline and loss of vital human resources. those cities have not been able to transform their economy towards a more knowledge intensive one yet.
- **Such an alarming performance gap between certain European cities implies that urban areas compete with each other, and that there is a growing need to address questions like the following ones:**
  - What is it that makes cities thriving in a more successful manner than other ones?
  - Why are some cities able to strengthen their knowledge base, and others are not?
  - And what are the most effective policies leaders of cities can follow?

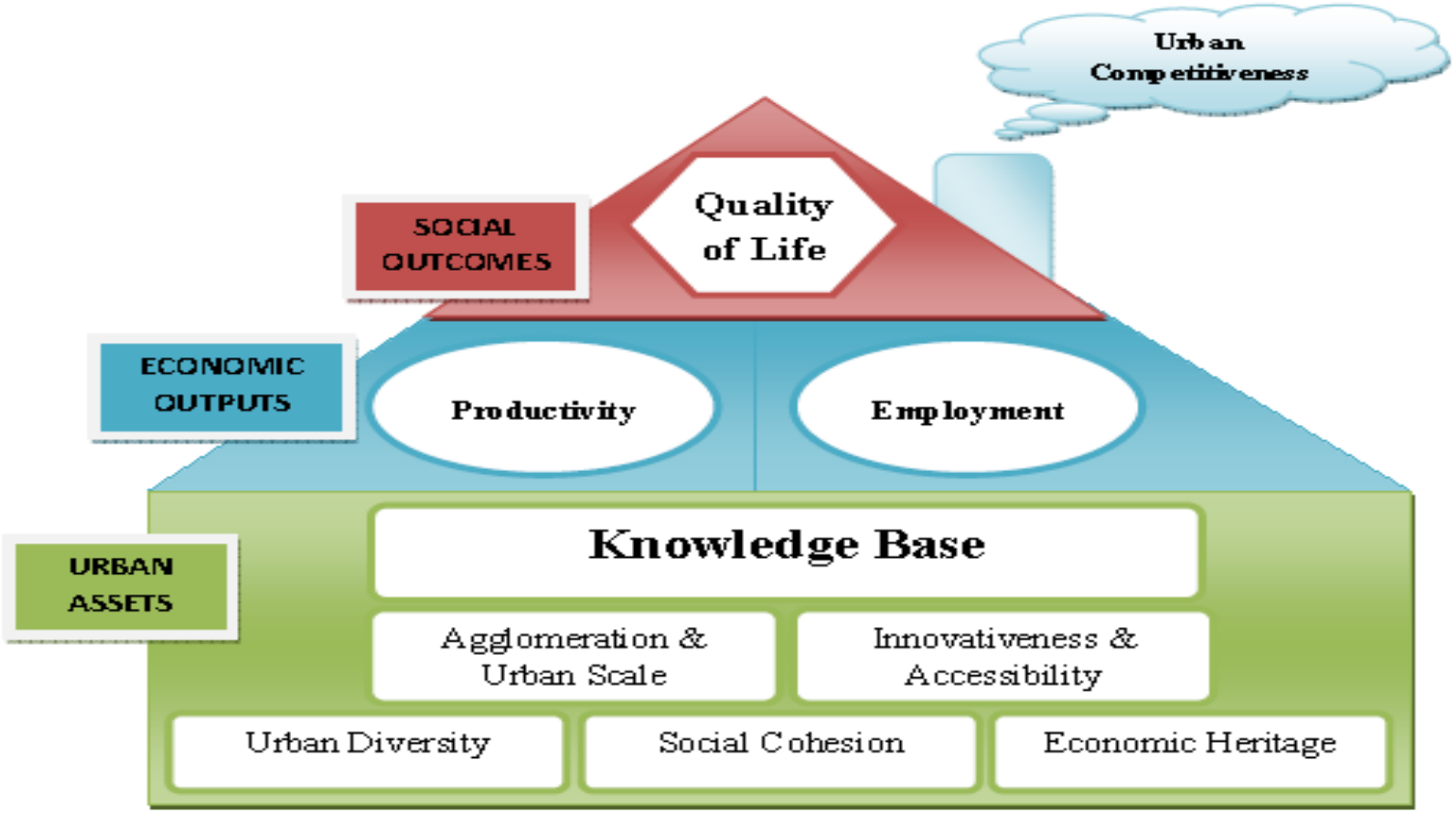
Pyramidal Model of Regional Competitiveness

- Broadly speaking, modern literature identifies two types of determinants:
  - those that are beyond any direct control of individual cities (e.g. currency exchange rates and interest rates), and
  - those that are within a city's touching distance to a greater or lesser extent.



(Source: Adapted from Gardiner et al.,2004)

Competitiveness Measurement Framework



Measurement Framework Used for Assessing the Competitiveness of City (Source: Adapted from Van den Berg et al. (2005, p. 16), Gardiner et al. (2004) and Deas & Giordano (2004, p. 194)

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Indices Used for Assessing the Competitiveness Level of a City

Asset 1 – KNOWLEDGE BASE (KB)	
Indicator 1	Number of students in universities and further education establishments per 1,000 resident population
Indicator 2	Proportion of working age population qualified at level 5 or 6 ISCED
Indicator 3	Public expenditure on education as a percentage of GDP (NUTS 0)
Indicator 4	Human resources in science and technology (HRST) as a share of the economically active population in the age group 15-74 (NUTS II)
Indicator 5	Life-long learning (NUTS 0 - % of total population)
Indicator 6	Proportion of residents who are not EU nationals and citizens of a country with a high Human Development Index (HDI)
Indicator 7	Percentage of households with internet access at home (NUTS II)
Asset 2 – URBAN DIVERSITY (UD)	
Indicator 8	Non-Nationals as a proportion of total population
Indicator 9	Nationals born abroad as a proportion of total population
Indicator 10	Migrant Integration Policy Index (MIPEX - 2004 - NUTS 0 - Final Score - 100 points possible)
Asset 3 – INNOVATIVENESS & ACCESSIBILTIY (IA)	
Indicator 11	European Regional Innovation Scoreboard (2006 RIS - NUTS I / NUTS II)
Indicator 12	Patent applications to the European Patent Organization (EPO) per 1,000 resident population (from 2002 till 2006 - NUTS II)
Indicator 13	R&D expenditures as a percentage of GDP (NUTS I / II)
Indicator 14	Length of public transport network (km/capita)
Indicator 15	Multimodal accessibility (EU27=100)
Indicator 16	Number of air passengers using nearest airport
Asset 4 – AGGLOMERATION & URBAN SCALE (AU)	
Indicator 17	Total resident population
Indicator 18	Total population of working age
Asset 5 – SOCIAL COHESION (SC)	
Indicator 19	Unemployment rate
Indicator 20	Number of recorded crimes per 1,000 resident population
Indicator 21	Total expenditure on social protection per head of population in € (NUTS 0)
Indicator 22	Inequality of income distribution visualized by income quintile share ratio (NUTS 0)
Indicator 23	At-risk-of-poverty rate (NUTS 0)
Asset 6 – ECONOMIC HERITAGE (EH)	
Indicator 24	Proportion of employment in industries G-P (NACE Rev. 1)
Indicator 25	ICT patent applications percentage of total patent application to the EPO (annual average from 2002 till 2006 - NUTS II)
Economic Output 1 – PRODUCTIVITY (PR)	
Indicator 26	GDP per head in €
Indicator 27	GDP per employed person in €
Economic Output 2 – EMPLOYMENT (EM)	
Indicator 28	Employment rate
Indicator 29	Average disposable annual household income in € (NUTS II)
Social Outcome – QUALITY OF LIFE (QL)	
Indicator 30	Quality of Life Index 2010 (NUTS 0 - Final score - 100 points possible)
Indicator 31	Expected healthy life years at birth (NUTS 0)
Indicator 32	Annual change in population in % (Data used for 2001 & 2004)
Indicator 33	Number of hospital beds per 1,000 residents
Indicator 34	Average price per m² for a house in €
Indicator 35	Number of cinema seats per 1,000 residents
Indicator 36	Number of tourist overnight stays in registered accommodation per year per resident population

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Relative Importance of Determinants Expressed through their Weighting Factor

DETERMINANT	WEIGHTING FACTOR
Knowledge Base	20%
Urban Diversity	10%
Innovativeness and Accessibility	10%
Agglomeration and Urban Scale	5%
Social Cohesion	10%
Economic Heritage	5%
Productivity	10%
Employment	10%
Quality of Life	20%

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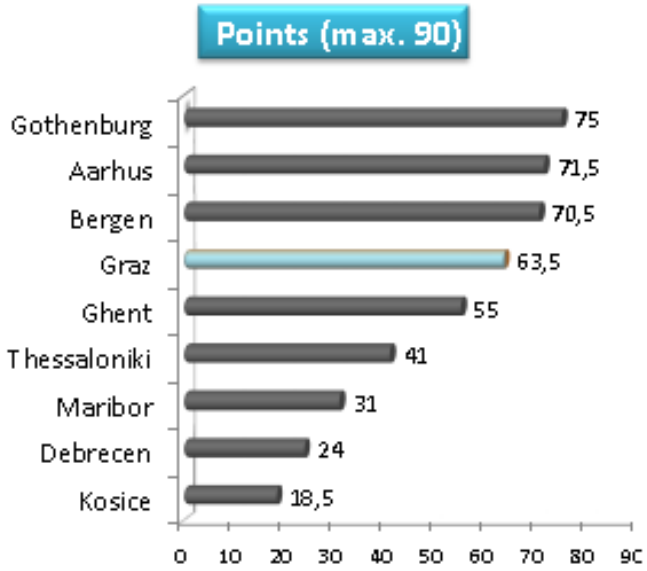
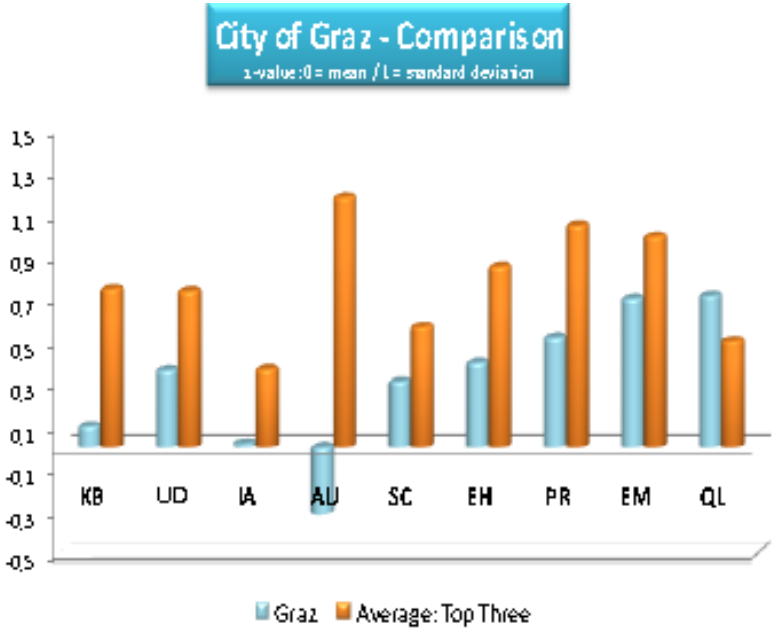
Results (1)

Rank & Points	KB	UD	IA	AU	SC	EH	PR	EM	QL
	R	R	R	R	R	R	R	R	R
Graz	**5**	**3**	**4**	**5**	**3**	**4**	**5**	**3**	**2**
Aarhus	1	6	3	3	2	2	3	2	4
Bergen	4	7	5	6	1	1	2	1	1
Debrecen	7	8	8	8	5	8	8	9	8
Ghent	3	4	1	7	8	3	4	5	6
Gothenburg	2	1	2	1	4	5	1	4	3
Kosice	9	9	7	4	7	7	9	8	9
Maribor	6	5	9	9	6	9	7	7	7
Thessaloniki	8	2	6	2	9	6	6	6	5

KB – Knowledge Base
UD – Urban Diversity
IA - Innovativness and Accessibility
AU - Agglomeration and Urban Scale
SC - Social Cohesion
EH - Economic Heritage
PR – Productivity
EM – Employment
QL – Quality of Life

Results (2)

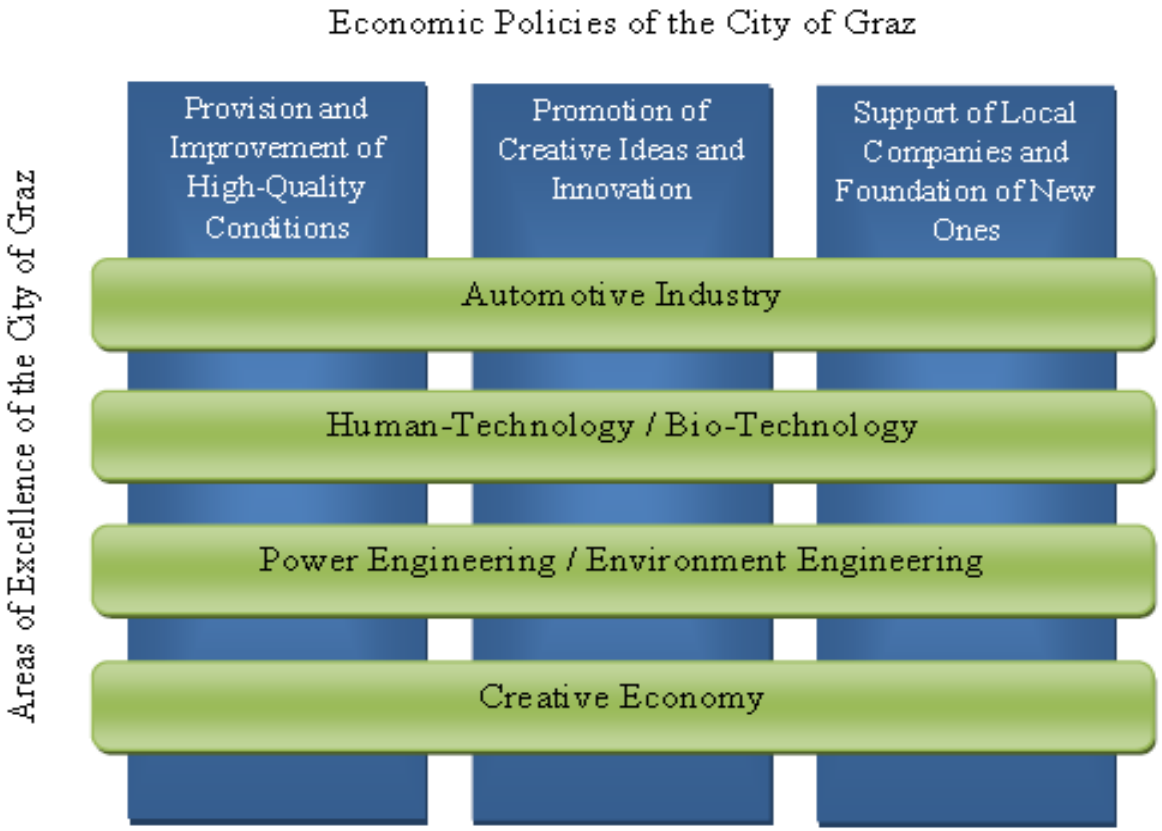




KB – Knowledge Base
UD – Urban Diversity
IA - Innovativness and Accessibility
AU - Agglomeration and Urban Scale
SC - Social Cohesion

EH - Economic Heritage
PR – Productivity
EM – Employment
QL – Quality of Life

Current Policy Focus of the City of Graz



(Source: Adapted from Graz Wirtschaft, 2009)

SWOT Analysis

Policy Recommendations

- Be Proactive and Plan for the Future
- Practice Leadership and Communicate a Clear Vision
- Develop the City's Human Capital
- Live and Breathe Creativity
- Stay Ahead of Technological Services
- Enhance the Development of Clusters
- Force Public-Private Networks and Partnerships
- Force Regional Collaborations
- Benefit from the City's 'Quality of Life' Advantage.

3. MANAGING CITIES/REGIONS

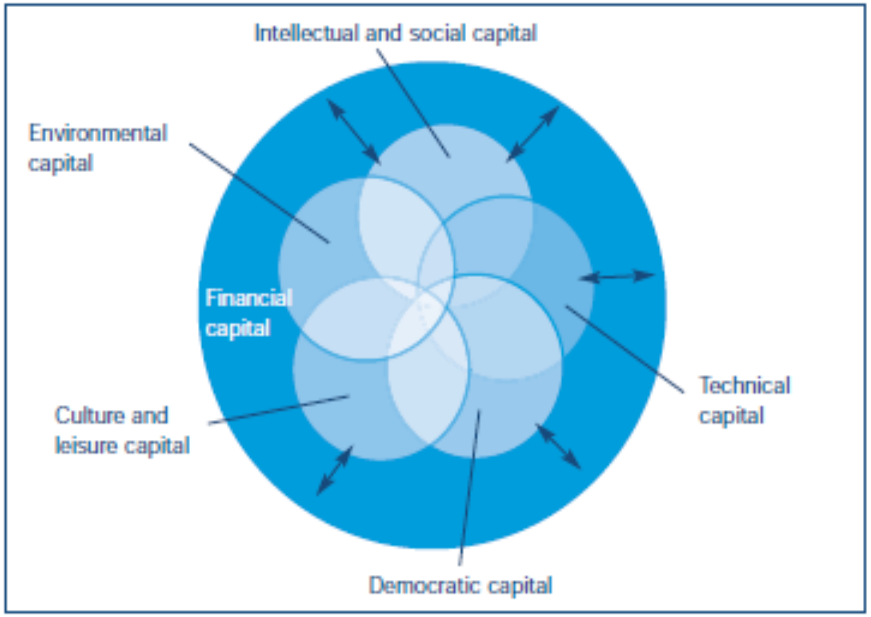
STRATEGIC MANAGEMENT OF C/R

STRATEGIC BRANDING AND IMAGING OF C/R

ROLE OF REGIONAL POLICY IN STRENGTHENING RESEARCH AND INNOVATION (R&I) – THE CASE OF THE EU

Six types of capital

- **There are six different types of capital discussed in this presentation:**
  - Intellectual and social capital – people and knowledge;
  - Democratic capital – participation and consultation;
  - Cultural capital – values, behaviours and public expressions;
  - Environmental capital – natural resources;
  - Technical capital – man-made capital and infrastructure; and
  - Financial capital – money and assets.



Challenges for capitals

- **Intellectual and social capital**
  - Competing in the international knowledge economy means ensuring that the appropriate people, skills and capabilities are developed, with city leaders demonstrating that they understand how these qualities can be captured
- **Democratic capital**
  - City administrations need to improve their accountability and transparency of their dialogue with citizens in order to achieve the commitment of the whole city on its journey into the future
- **Cultural and leisure capital**
  - The competition among cities is intense, and a strong city brand is a potent weapon to maximise the visibility of a city's qualities and allow it to differentiate itself
- **Environmental capital**
  - As quality of life becomes an important source of competitive advantage, cities have to provide a clean, green and safe environment for their citizens.
- **Technical capital**
  - The demands on a city's infrastructure change and expand constantly. Cities have to ensure that these assets can support the changing needs of their citizens.
- **Financial capital**
  - Growing demands on cities' budgets, combined with diminishing revenue bases mean that cities need to be creative and flexible in their financial strategies.

Strategic management of a C/R (3)

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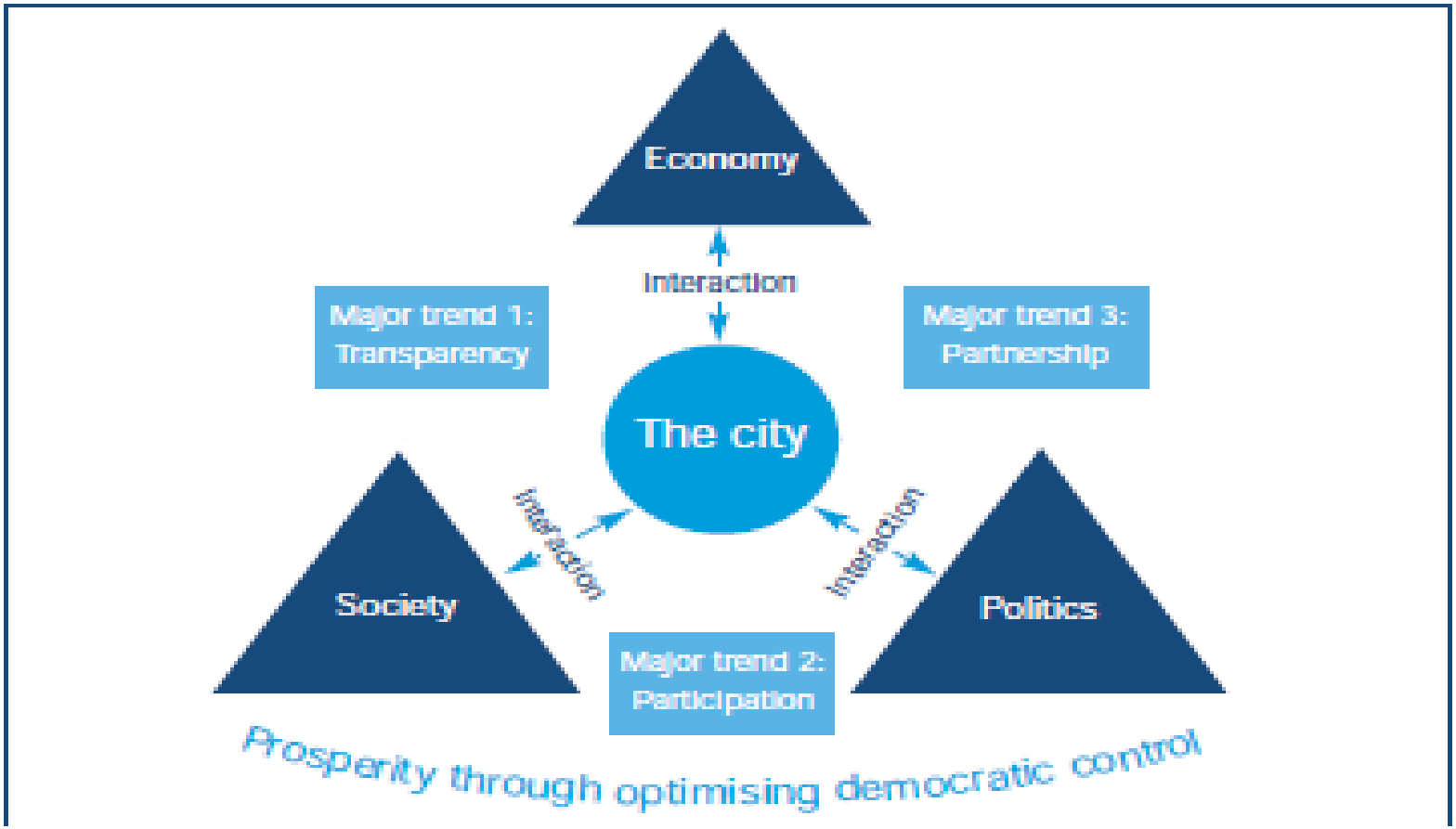
Interactions between politics, society and economy with the three major trends to optimize democratic capital



Strategic management of a C/R (4)

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Navigating into the future requires an open mind and leadership

- **The navigation process depends on how we consider our position today and what kind of approach we will use to reach our future vision. Below are four different approaches to navigating in relation to the surrounding world:**

Inactive	No interpretation of trends
Reactive	Responding to the agenda of others
Proactive	Make detailed plans for the future and set trends
Interactive	Shape and respond to changing trends over time

Strategic management of a C/R (5)

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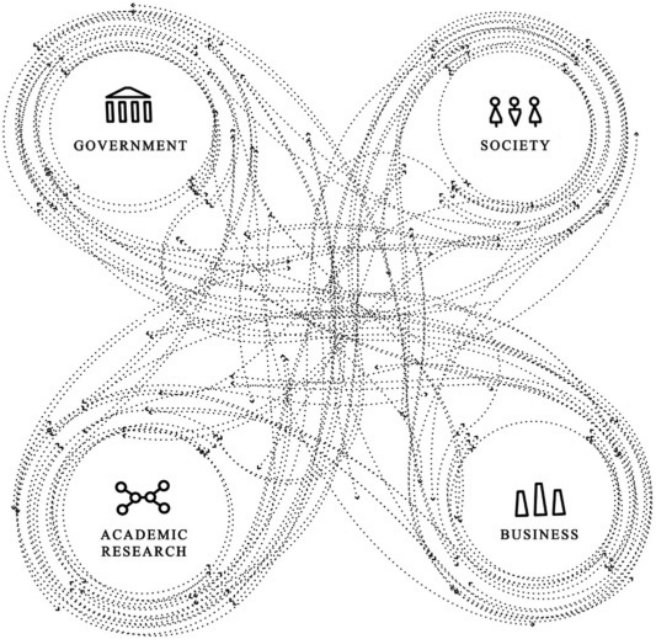
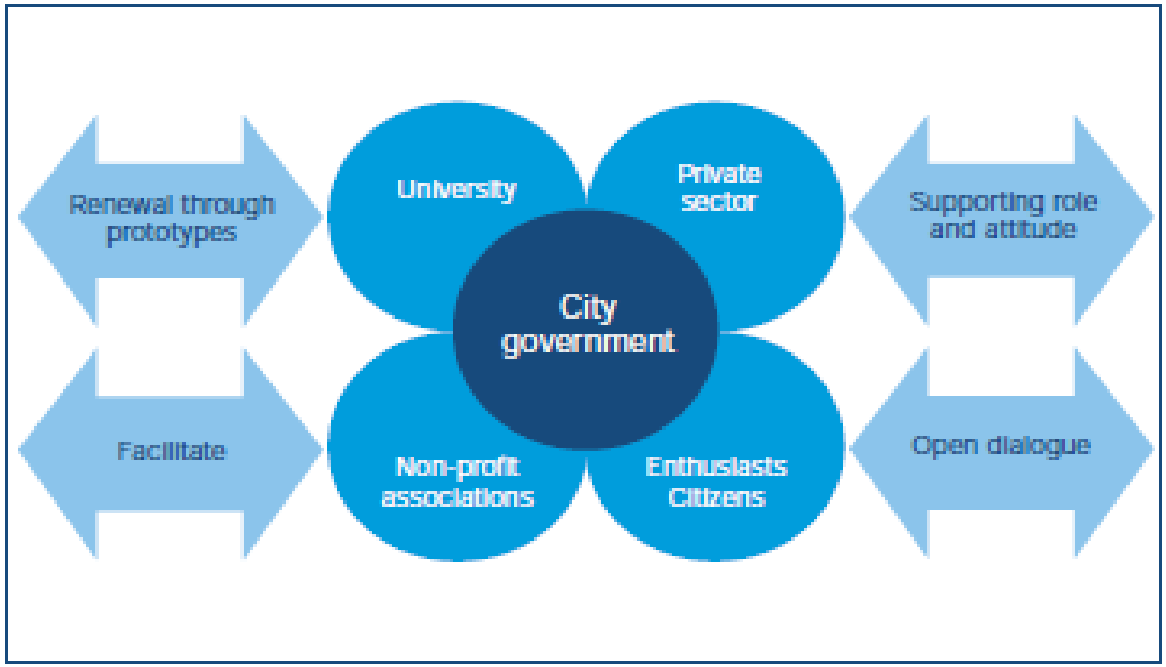
Values and attitudes underpinning successful relationships

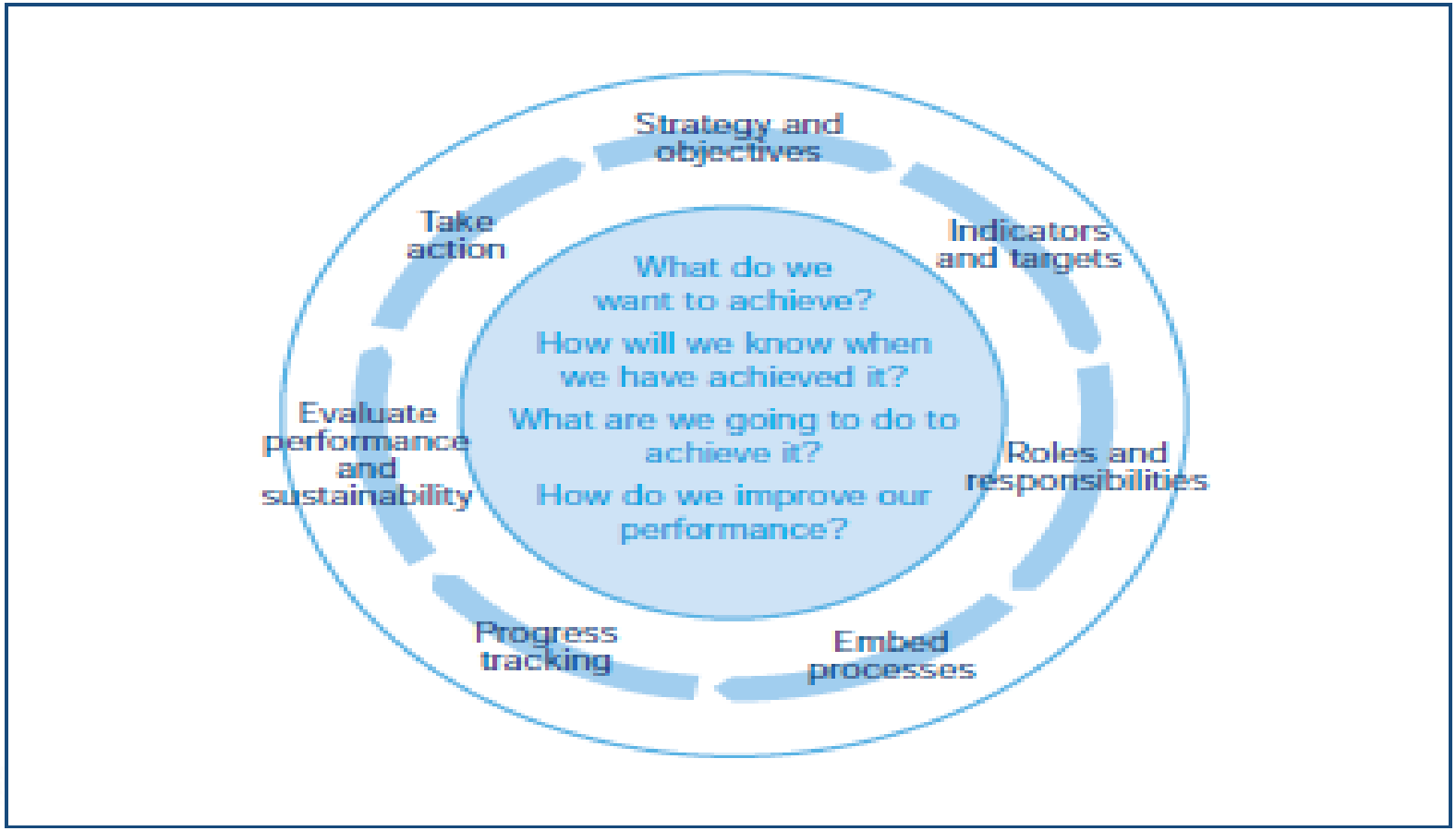




Strategic Questions

- In what areas is your city in a lead position? (closer to the future) than your “competing” cities?;
- Do you and your leadership group have an interactive approach to strategic navigation, which means understanding what’s going on in your environment, and trying to interpret what it will mean for the organisation in the future?;
- Has your city developed a strategic tool for “city intelligence”?; and
- How much of your working time do you spend thinking about the future?

Framework for Performance Management



Strategic management of a C/R (8)

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Case: Glasgow – Leader in Strategic Area Regeneration

- Strategic Regeneration
  - Clyde Waterfront
  - Clyde Gateway and East End
  - Commonwealth Games: Back the Bid
  - Massive investment in housing and neighbourhoods
- Innovative funding solutions to improve scale, quality and sustainability
- Glasgow must re-establish its position as a leader in strategic area regeneration

Strategic management of a C/R (9)

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Case: Oulu – public-private-partnership

- ”The Oulu Model” combining the high level expertise, innovation and industrial capacity – European good practice for Growth and Competitiveness contributing to the Lisbon Agenda.
- **Key elements:**
  - Driven by **entrepreneurship**;
  - **Trust and true collaboration** between **public and private stakeholders;**
  - Widely **common goals**;
  - Strongly **committed partners** – strong political commitment as well.

Strategic management of a C/R (10)

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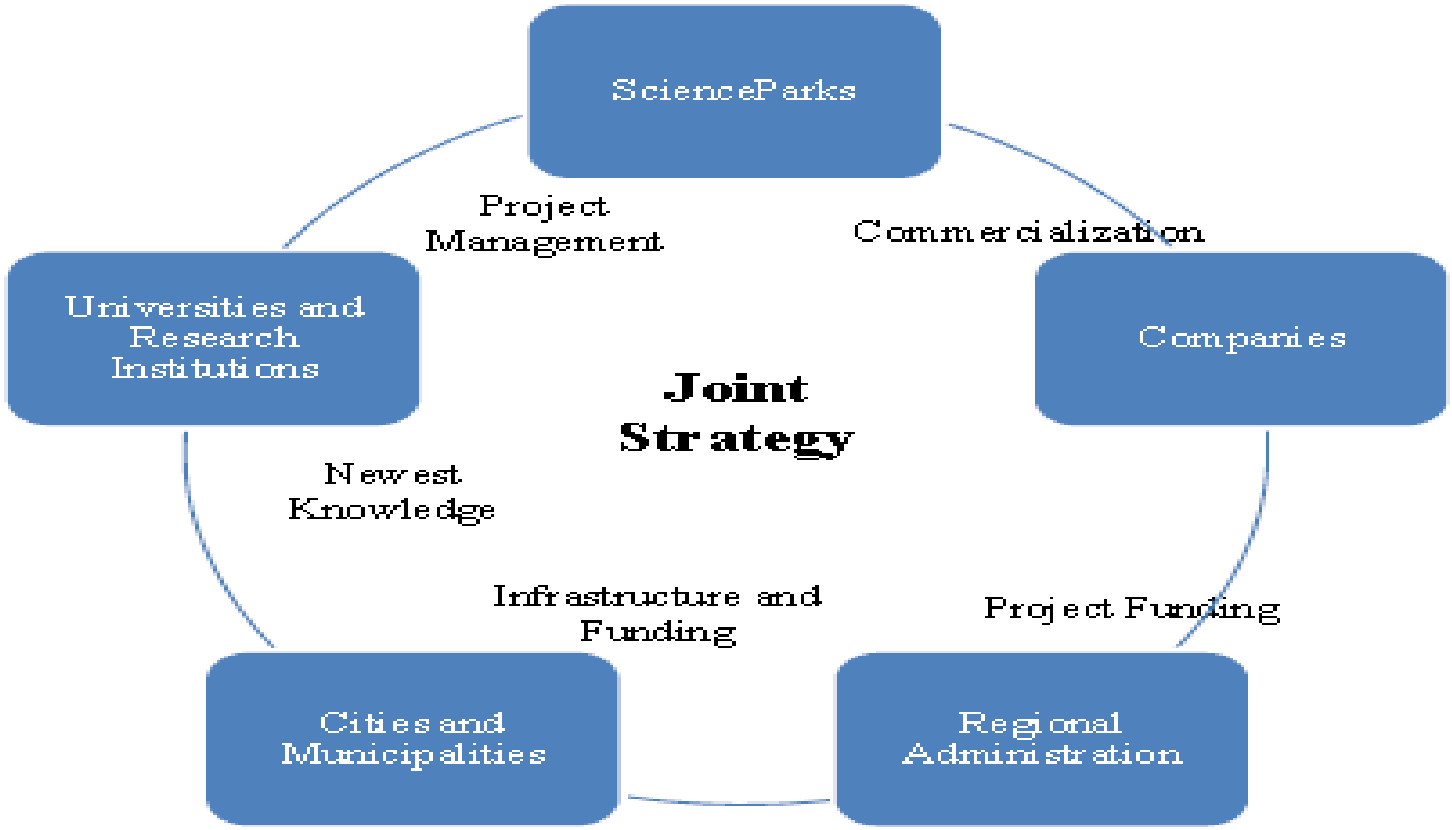
Helsinki's Public-Private Partnership Program



Source: Adapted from (OECD, 2006, p.125

Eight–Step Process to Develop a Place Brand

Source:Branding a City, 2006

Step 1: Define clear objectives

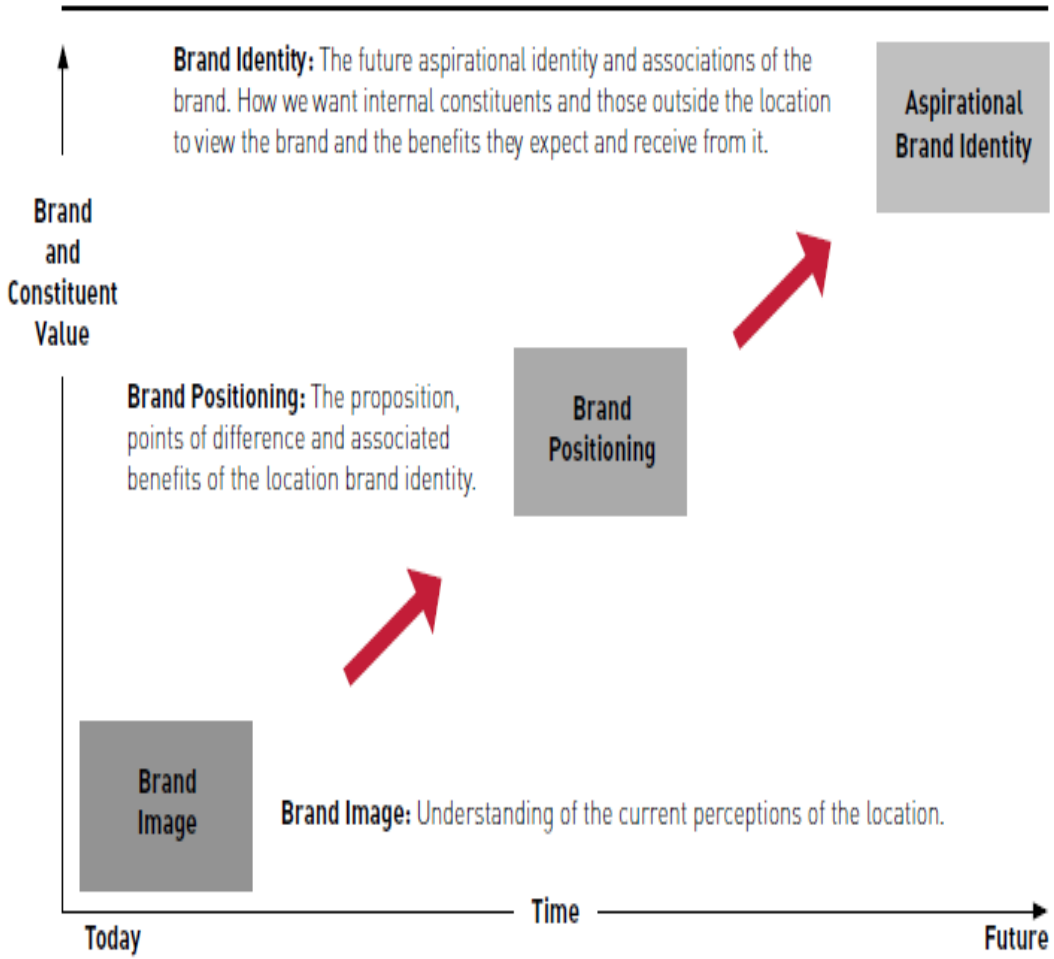
- **What is the project trying to achieve?**
- **What specific results are you seeking from the development of a brand strategy?**
  - These questions should have been asked generally as the brand strategy organization was formed but are to be addressed in greater detail as it launches its work.
  - It is imperative that decision makers understand the goals and objectives of the branding initiative.
  - Is the primary objective to attract and retain residents? Drive commerce? Attract visitors? Change current perceptions?
  - The answers to these questions (and the priorities among them) help define the scope of the project, the appropriate stakeholders with whom to speak and the key activities that form the approach to the initiative.

Step 2: Understand the audiences you are trying to attract

- Who does the audience consist of?
- What are their current perceptions and attitudes of the place?
- What do they need that a city can provide? Can your city meet that need?
- If so, how?

Step 3: Identify current brand image of the place

- What associations are linked to the place?
- Has the image of the place changed over time?
- What is the current personality of the place?
- What visual imagery does the place evoke?

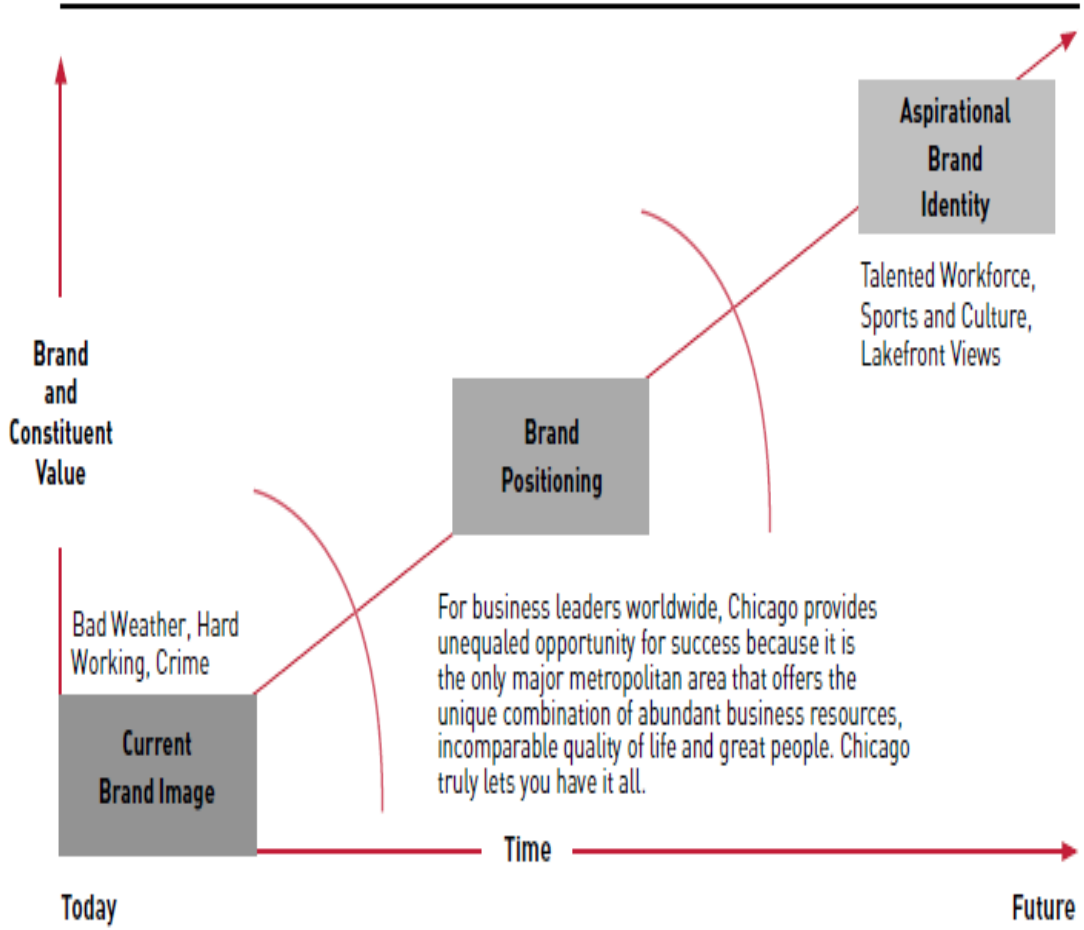


Step 4: Set the aspirational identity for the place

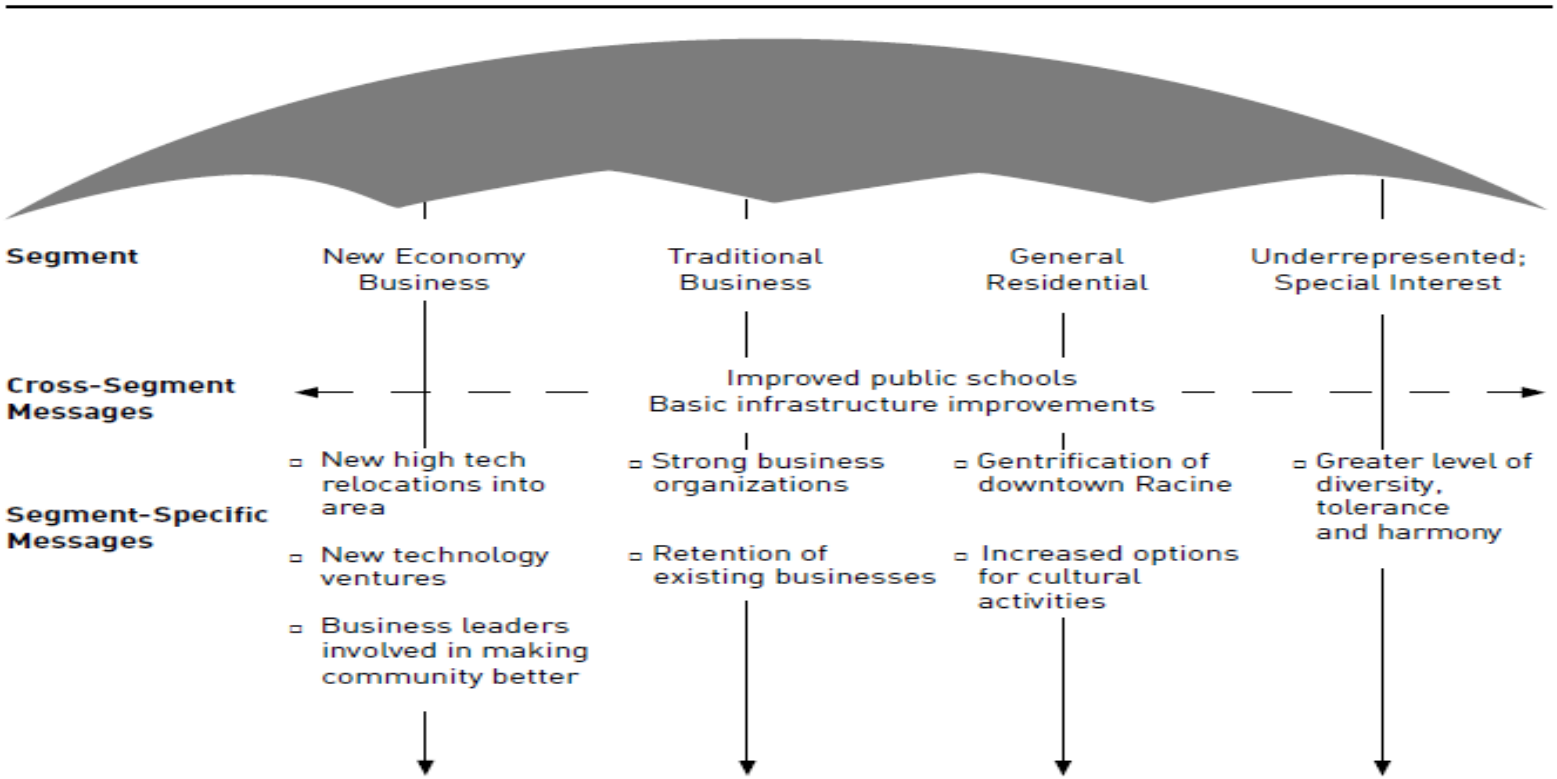
- What do you want the place to stand for?
- What associations do you want people to think of when they think of the place?
- What is the ideal personality or persona for the place?
- What type of experience would you like to have there?

Step 5: Develop the positioning

- What is the primary benefit the place is providing?
- What are the elements of proof to support the benefit?



Step 6: Create value propositions for priority target segments



Step 7: Execute the strategy

- In developing your brand-based marketing plan, it is critical to think about every point at which the target audience may come into contact with your brand.
- Every interaction or point of contact with the target audience is an opportunity either to enhance or denigrate your brand.
- These points of contact, or touchpoints, may include a wide spectrum of elements such as the physical environment, the airport, street signage, advertising, brochures, web site, events, media and even the attitude of residents.

Step 8: Measure success

- The adage, “What is not measured is not managed,” is true for all branding, whether product, service or place.
- The link between business and brand strategy becomes evident as return on investment and the positive economic, social and political impact are measured over time.
- There are generally three principles for measuring success for a place brand strategy:
  - Monitoring the success of branding efforts with key audiences
  - Measuring the effectiveness of branding and marketing activities over time
  - Showing the effect the brand has on the business by measuring the brand metrics in conjunction with the economic and community development metrics.

3.3. ROLE OF REGIONAL POLICY IN STRENGTHENING THE RESEARCH AND INNOVATION (R&I) – THE CASE OF THE EU

Thematic objectives and major policy priorities

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- **Although the new CPR is based on the framework of the current CPR, it nevertheless introduces a number of innovations. For instance, from 11 'thematic objectives' in the 2014-2020 period, the new regulation will now focus its resources on five policy objectives:**
  1. a smarter Europe, through innovation, digitalisation, economic transformation and support for small and medium-sized businesses;
  2. a greener, carbon free Europe, implementing the Paris Agreement and investing in energy transition, renewables and the fight against climate change;
  3. a more connected Europe, with strategic transport and digital networks;
  4. a more Social Europe, delivering on the European Pillar of Social Rights and supporting quality employment, education, skills, social inclusion and equal access to healthcare;
  5. a Europe closer to citizens, by supporting locally-led development strategies and sustainable urban development across the EU.

65 – 85 %

The landscape of innovation-related policies in the EU (1)

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- In 2020, regional innovation policy will be 30 years old but before that anniversary it needs to be fully coordinated with other types of EU innovation-related policies.
- Innovation-related policies are broadly defined policy areas which seek to enhance knowledge generation, absorption and diffusion in the economy (and society) so as to support an innovation-driven economy and to solve major societal problems.
- For our purposes, it is useful to differentiate five main policy areas:
  - Research and development (R&D)-driven innovation policy
  - Industrial policy
  - Cohesion or regional policy
  - Sectoral policies or mission-oriented policies for grand challenges, and
  - Policies supporting knowledge transfer and co-generation via various types of innovation-based value and supply chains.

The landscape of innovation-related policies in the EU (2)

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Figure 1: Towards the integration of EU research and industrial innovation policies

The landscape of innovation-related policies in the EU (3)

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- ***R&D-driven innovation policy*** is traditionally focused on the generation of new technology and frontier knowledge with a view to the commercialisation of R&D-based knowledge.
- This is the major policy area for generating technology-based growth, and represents the key focus of most EU countries and regions, be they laggards or technology leaders.
- The EU Framework Programme for R&D (Horizon) also follows this approach.
- In the EU, the specific types of R&D-driven innovation policy focus either on
  - science and collaborative R&D, or
  - on the commercialisation of public R&D, or
  - on business R&D.
- However, they all assume that the R&D is the major source of knowledge for innovation and that science and technology (S&T) opportunities are the main drivers of technological change.

4. THE ROLE OF UNIVERSITIES IN REGIONAL DEVELOPMENT AND CLUSTER FORMATION

Who	What
Public Authorities	What is the role of universities in regional growth?
	What are some of the mechanisms for involving universities in delivering regional growth?
	How can the barriers to mobilising universities be identified and overcome?
	How can effective partnerships and strategies be created to maximise the relationship between universities and regions?
Universities and other research or academic partners	What benefit can universities get from working with regional development partners?
	What specific activities can universities get involved in?
	How can universities improve their ability to engage with regional development actors?
	What can be done to influence policy makers?
Business and other commercial or social partners	What are the benefits of cooperating with unversities?
	What specific activities can be used to leverage the resources of universities?
	How can commercial and social partners maximise engagement in regional development and planning?

OECD Analysis Framework

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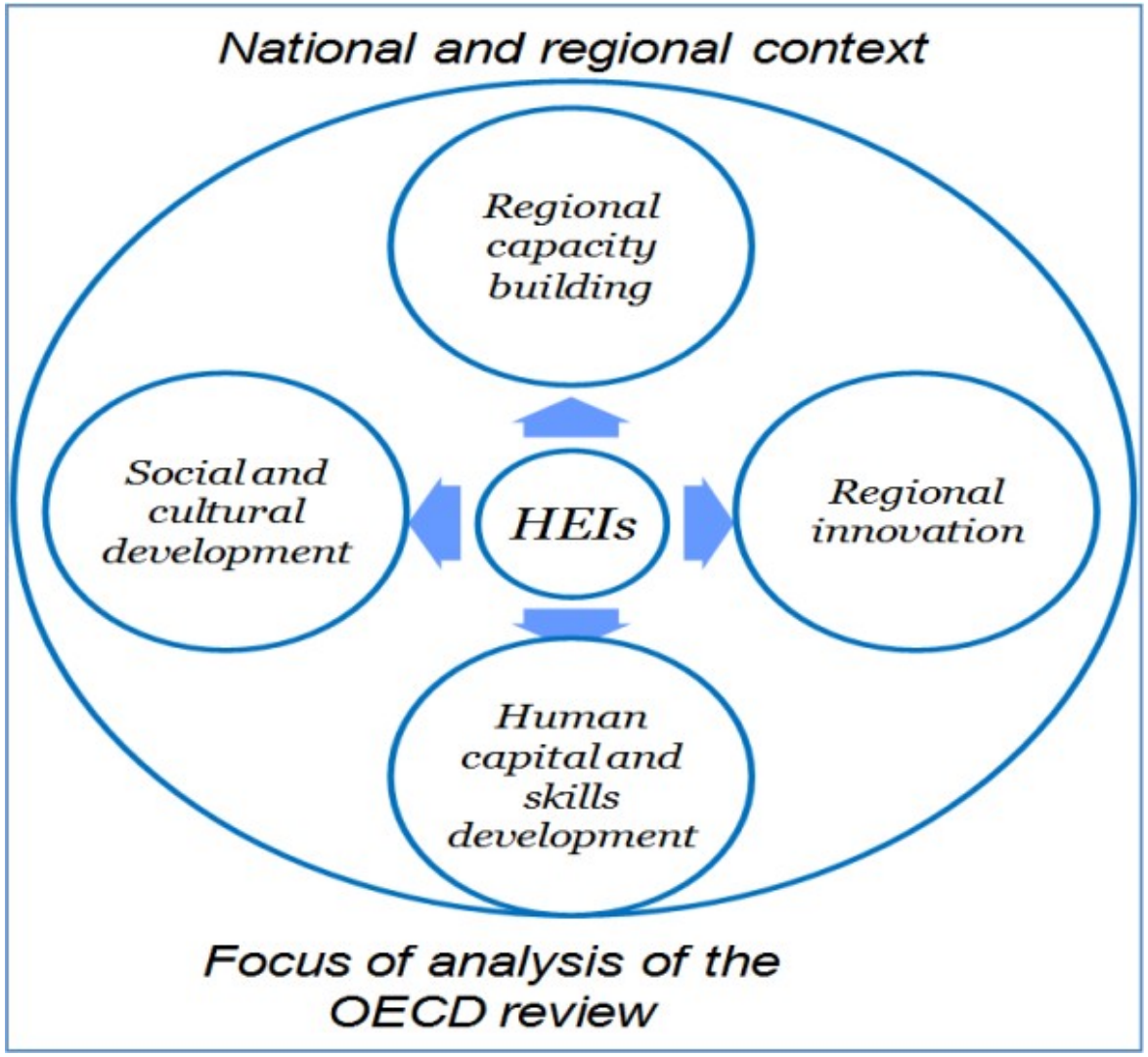

Four key areas for university engagement in regional development

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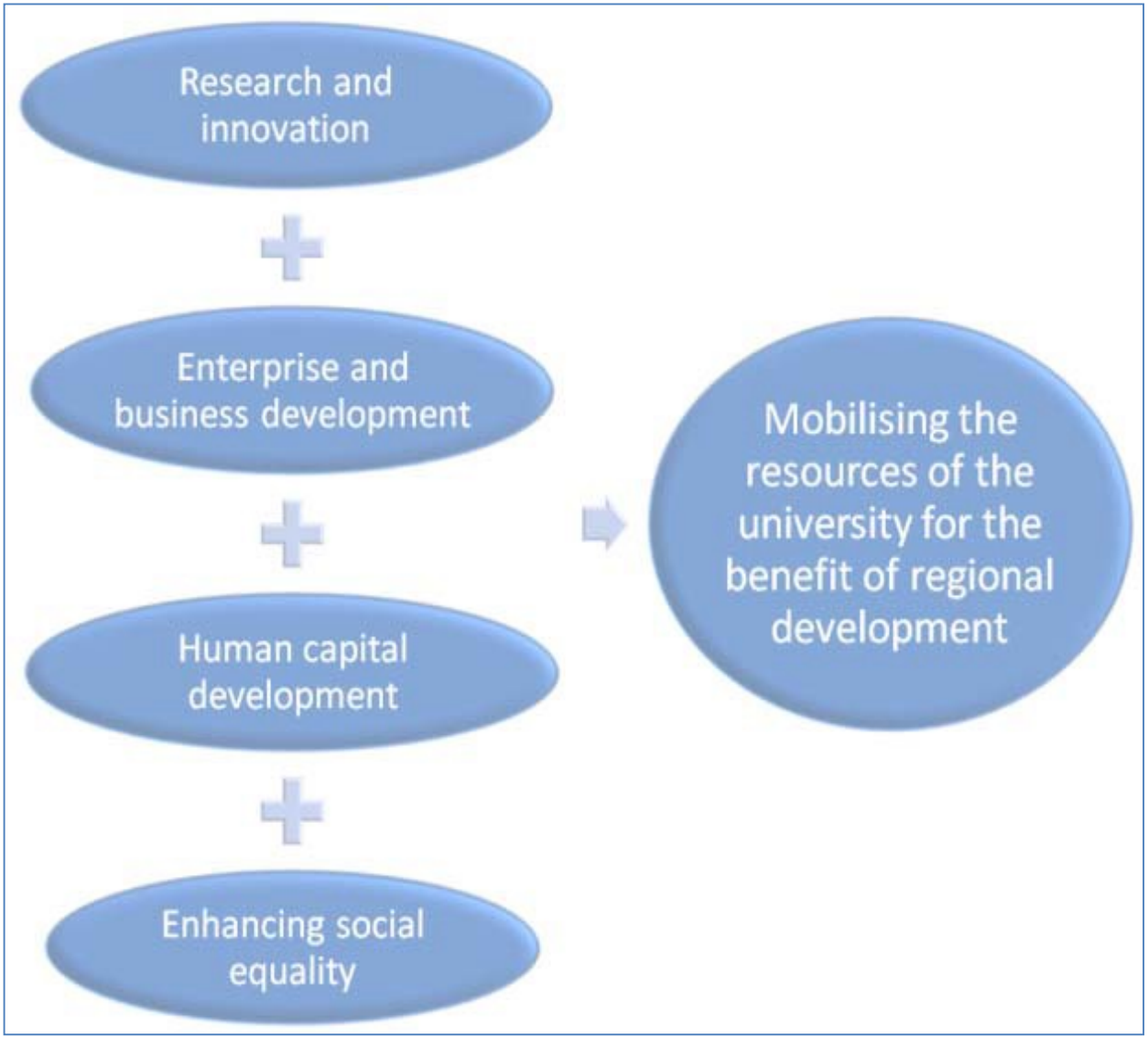

Enhancing regional innovation through research activities

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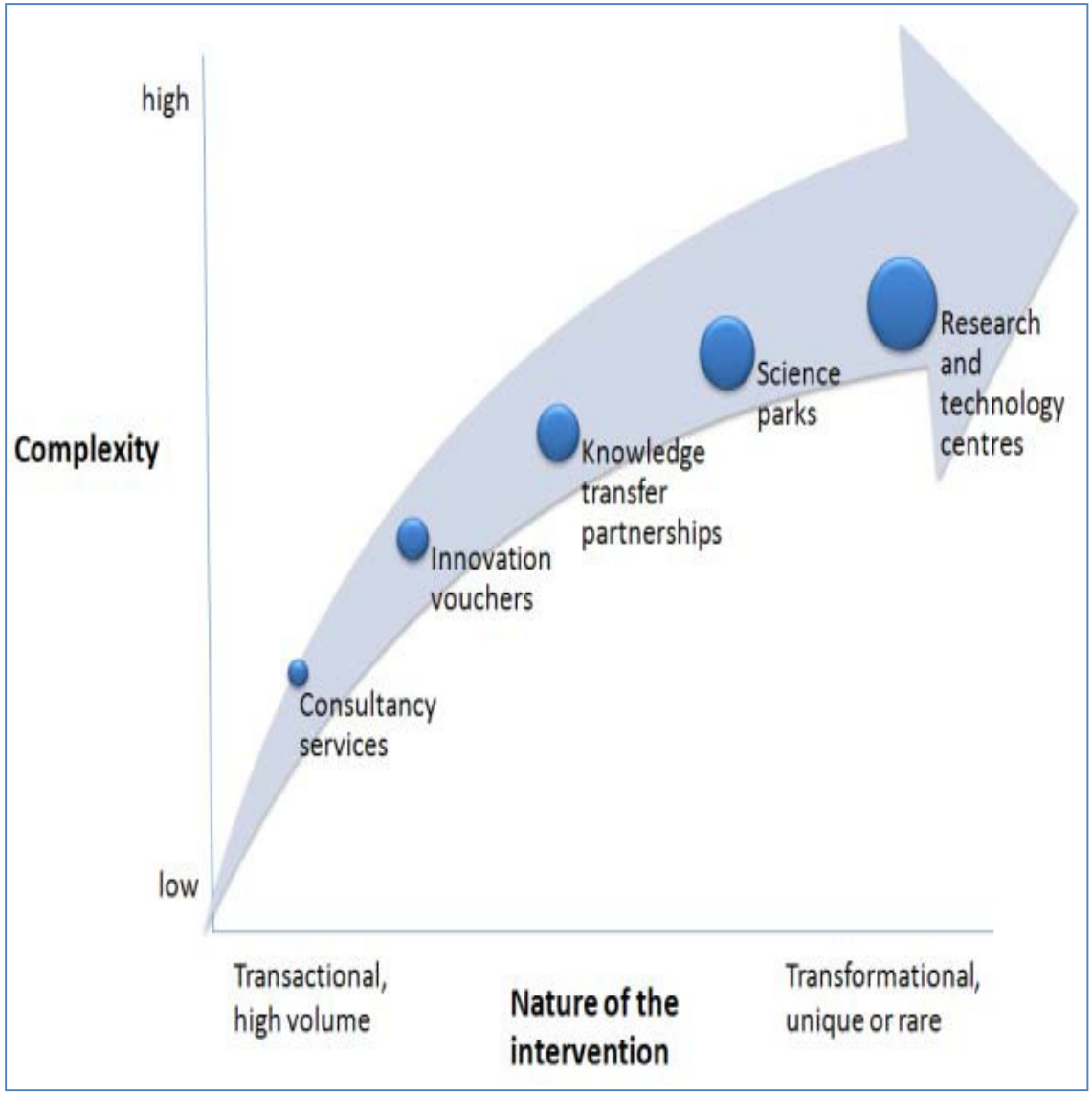

Technology readiness

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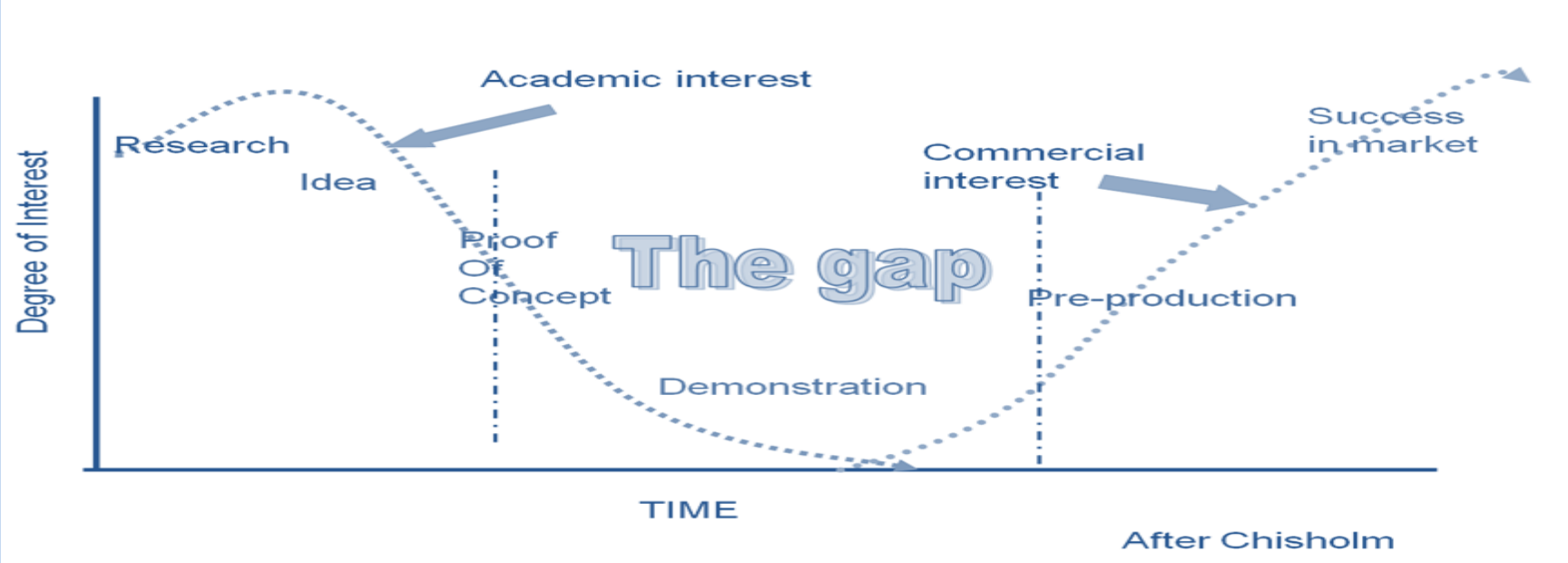

Promoting enterprise, business development and growth

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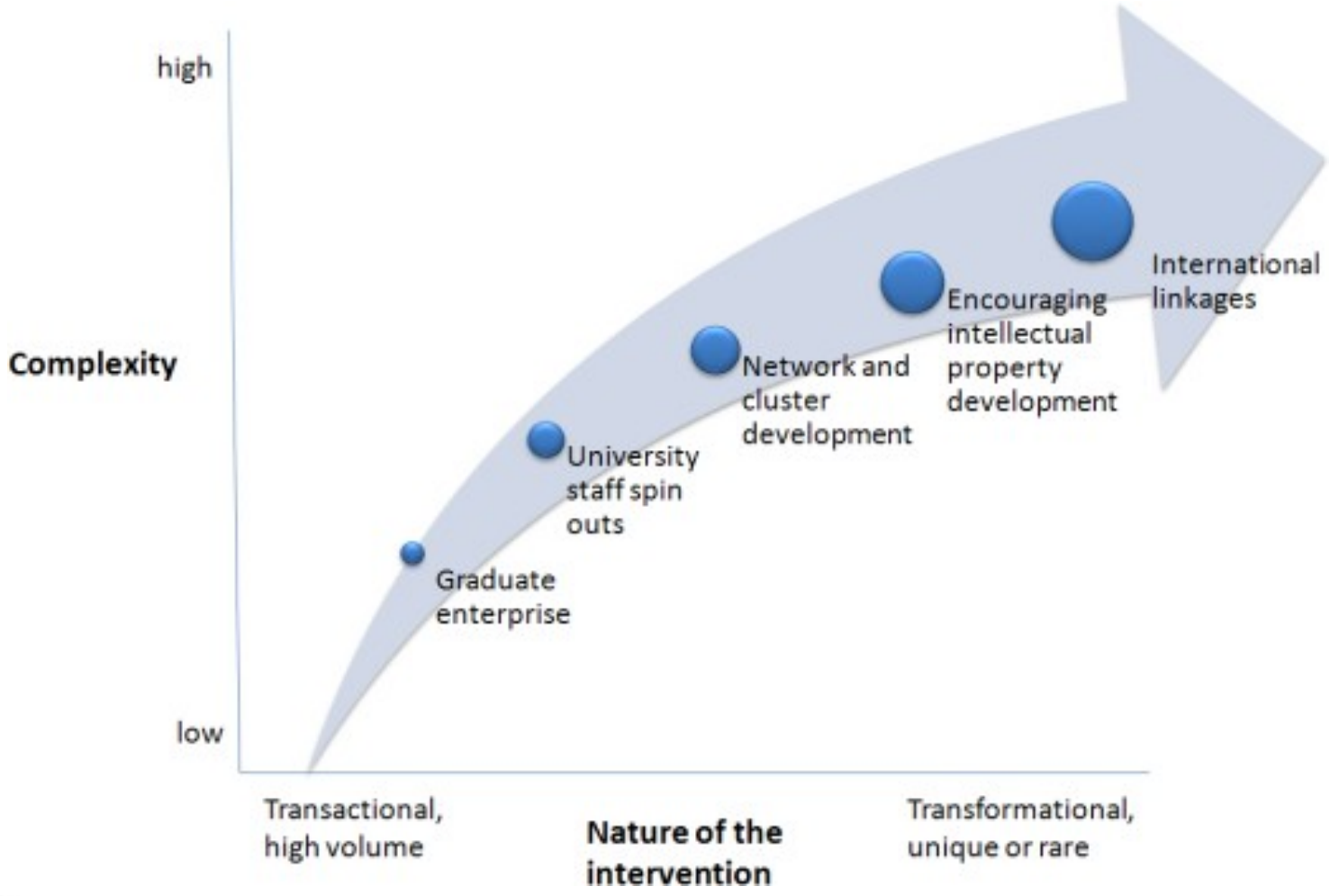

Development of regional human capital

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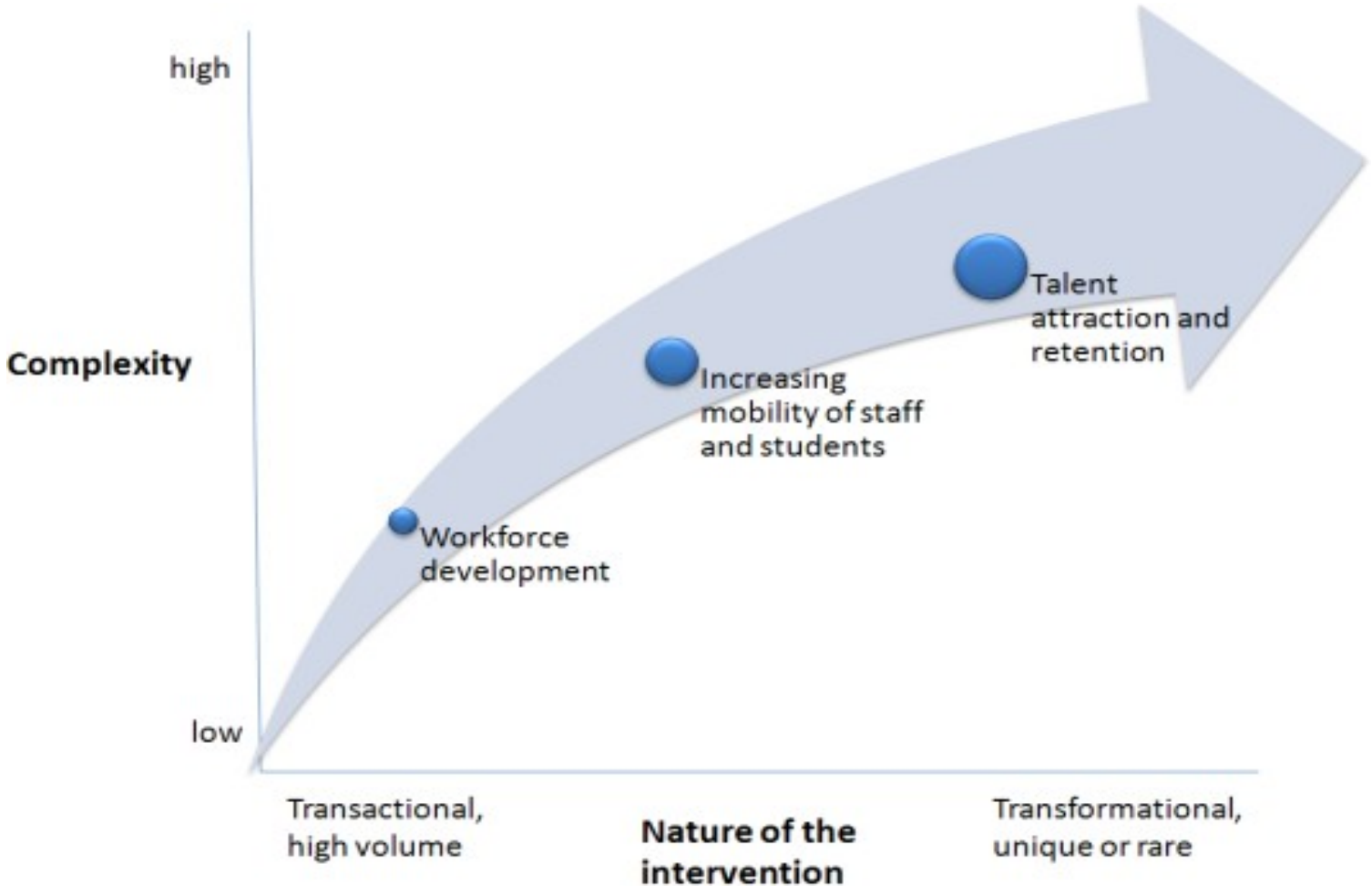

Barriers increase as activities become more transformational

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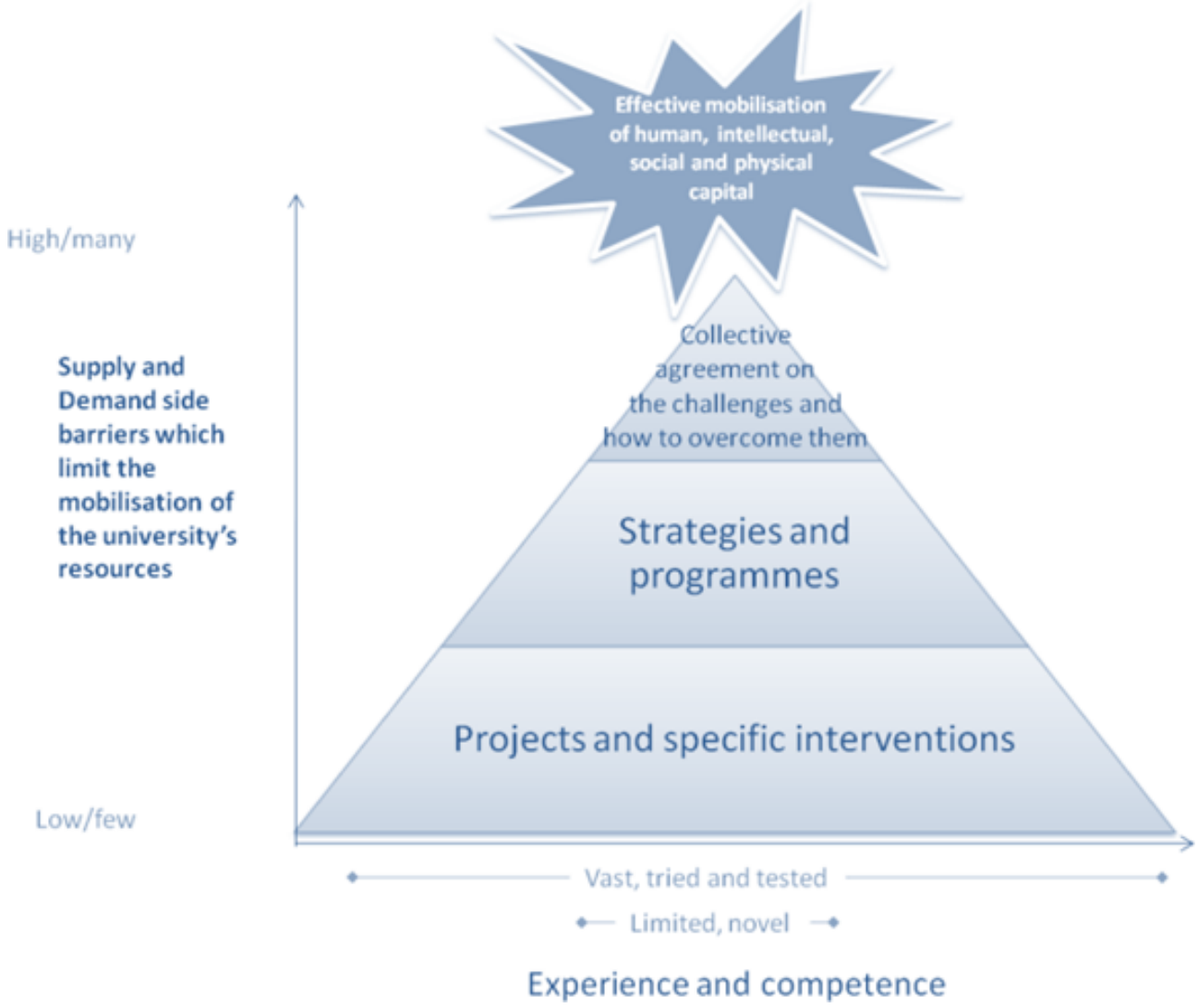

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5. VISION AND STRATEGY MODEL FOR MUNICIPALITIES – A CASE

Introduction

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- Exposure to new sources of competition across the world encourages cities to become more competitive and to allocate their resources more effectively and efficiently. Respond to the demands of many different groups and managing the allocation of resources between different claims is nowadays one of the most important challenging tasks for city governments.
- To reaching their desired destination cities must be aware of where they are starting out. First, they should identify their strengths and weaknesses, and after that define the position they want strive for in the future. And by defining the position of the future, they need to be aware of the significant trends and other factors that will influence the direction in which the future unfolds.
- To overcome the challenges mentioned many successful European cities designed a model which simplifies the monitoring of long-term goals. The important thing is that these goals are consistent with the city's development vision and strategy, and both must be based on values, wishes and priorities of the local residents.

The Model

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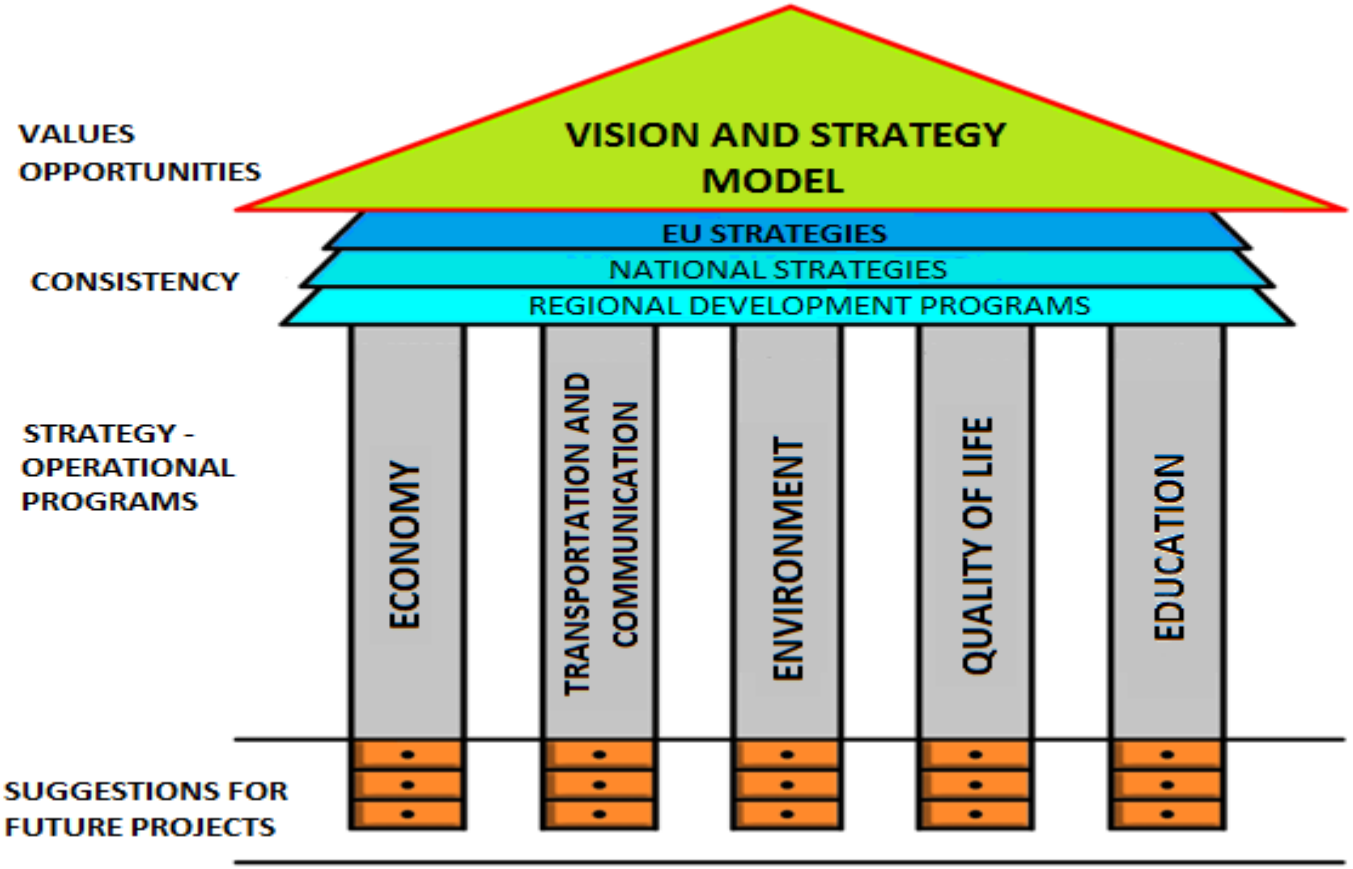

- The “vision and strategy” (VIS) model for municipalities consisits of the following activities:
  - semi-structured in-depth interviews with city representatives and engaged citizens
  - public opinion surveys
  - analyzing strategic development documents (national strategies, regional development programs, strategic technology program)
  - defining framework for vision and strategy models,
  - introducing five pillar model for strategic economic planning,
  - introducing systems of indicators.

The process for the creation of City Vision and Strategy model

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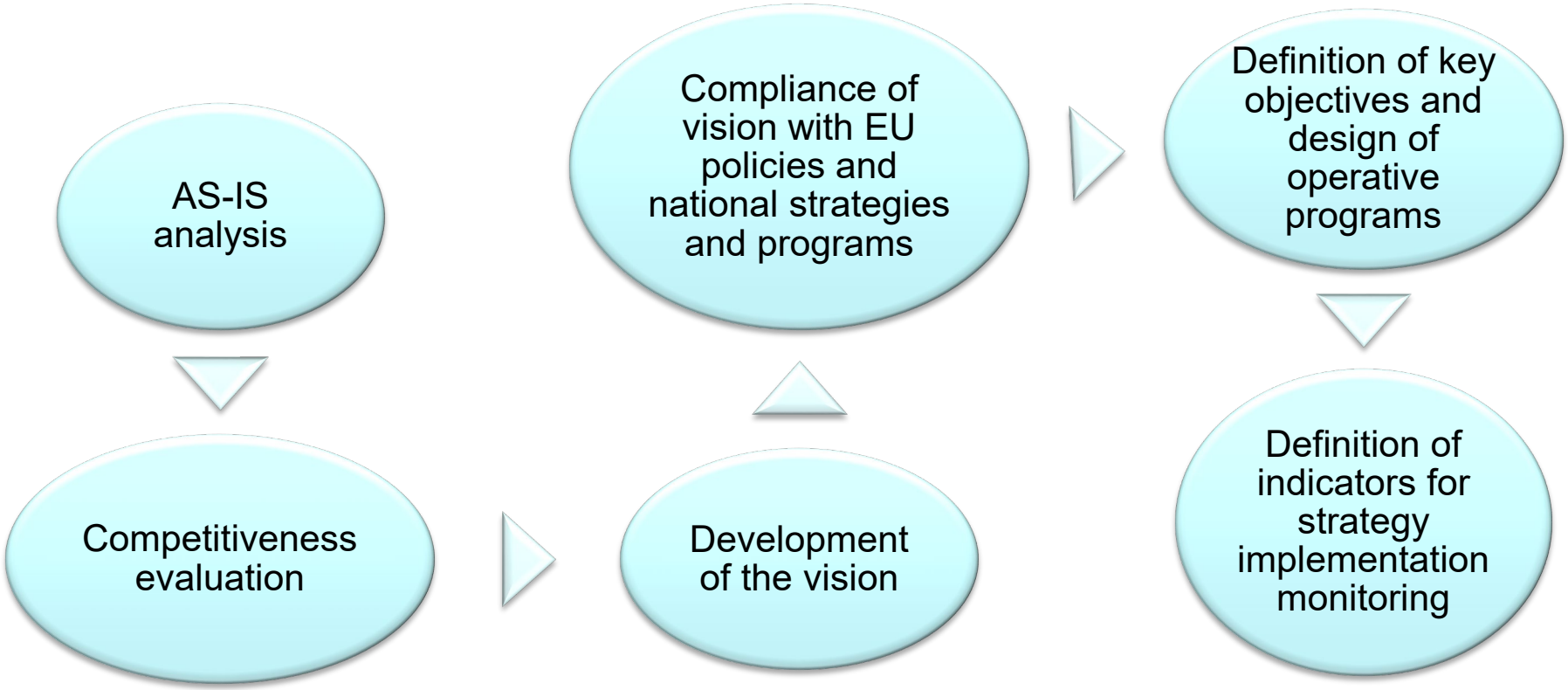

The Role of Universities in Regional Development and Cluster Formation

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Introduction

As the economies of the industrial countries rapidly become more knowledge-based, universities are seen as holding the key to regional economic development and cluster formation. The OECD defines the knowledge-based economy as one in which the production, use, and distribution of knowledge and information are critical to the process of economic growth (OECD 1996). Not surprisingly, the role of the university is central to the emerging knowledge-based economy. Indeed a recent survey in *The Economist* suggests the conception of the knowledge-based economy "portray(s) the university not just as a creator of knowledge, a trainer of young minds and a transmitter of culture, but also as a major agent of economic growth: the knowledge factory, as it were, at the centre of the knowledge economy" (David 1997, 4).

Closely related to this is the idea that universities can also jump start the emergence of dynamic regional clusters of firms and thus act as crucial contributors to regional economic development. The well documented cases of a few highly successful examples, particularly the central role attributed to Stanford University in the growth of Silicon Valley (Gibbons 2000), or MIT in the development of Route 128, have contributed to the widely held view that universities can act as 'engines of innovation' generating new ideas to spur the creation of commercial products and indirectly, as the spark for regional industrial clusters. This overly mechanistic view of the process by which basic scientific research is transformed into economically valuable products places an unacceptable burden on the role that universities are expected to play. At the same time, this widely accepted piece of conventional wisdom fails to explain the equally significant number of cases where leading research institutions, such as Carnegie Mellon (Florida 1999)or Johns Hopkins (Feldman and Desrochers 2003)have clearly failed to generate the same kind of spinoffs and regional benefits as occurred in Silicon Valley. Clearly these counter factual cases suggest the need for a more nuanced and contextualized understanding of the actual role that universities play in regional economic

development and cluster formation.

The shift to a more knowledge-based economy embodies a number of changes in both the production and application of new scientific knowledge that have critical implications for the processes of knowledge transfer and regional economic development. One of the most significant of these changes involves the relation between the codified and tacit dimensions of knowledge. The dramatic expansion of the higher education sector and the increased funding for research that has, in part, fueled its growth has generated substantial increases in scientific and research output which largely takes the form of codified knowledge, transmitted relatively easily between researchers through published scientific papers and formal presentations. But as the stock of scientific knowledge grows and becomes more widely accessible through electronic and other means, the relative economic value of that knowledge is diminished by its sheer abundance. Often access to the key elements of the knowledge base depends upon the second or tacit dimension. Following the work of Michael Polanyi (1962), tacit knowledge refers to knowledge or insights, which individuals acquire in the course of their scientific work that is ill-defined or uncodified and that they themselves cannot articulate fully. It is highly subjective and often varies from person to person. Furthermore, individuals or groups working together for the same firm or organization often develop a common base of tacit knowledge in the course of their research and production activities (Nelson and Winter 1982, 76-82; Dosi 1988, 1126). The tacit dimension of knowledge is particularly significant for regions and communities, for it is the kind of knowledge that tends to be locally embedded. In a knowledge-based economy, spatial proximity is thus a critical factor for accessing this kind of knowledge and exploiting its commercial potential.

The second change concerns the centrality of learning for the innovative process. Lundvall, among others, argues that the knowledge frontier is moving so rapidly that access to, or control over, knowledge assets affords merely a fleeting competitive advantage. It may be more appropriate to describe the emerging paradigm as that of a 'learning economy', rather than a 'knowledge-based' one. Recent work indicates that innovation is a *social process* triggered by consumers (or 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' (Lundvall 1992). It involves a capacity for localized learning within firms, between firms, and between firms and the supporting institutions. Learning in this sense refers to the building of new competencies and the acquisition of new skills, not just gaining access to information or codified scientific knowledge. In tandem with this development, forms of knowledge that cannot be codified and transmitted electronically (tacit knowledge) increase in value, along with the ability to acquire and assess both codified and tacit forms of knowledge, in other words, the capacity for learning (Maskell and Malmberg 1999). The regional level is important for this form of learning because firms within a local region often share a common culture that facilitates learning among them and it is supported by a common set of regional institutions.

The Role of Universities in the Knowledge-Based Economy

Despite the growing consensus that the industrial economies are becoming more 'knowledge-based', there remains considerable controversy over the role that universities should be expected to play. Consistent with the view of universities as 'knowledge factories' for the new economy, many policy-makers view universities as largely untapped reservoirs of potentially commercializable knowledge waiting to be taken up by firms and applied. They hope that once this knowledge is harnessed, it will fuel innovation within the firm, thereby increasing the firm's productivity, stimulate the emergence of regional industrial clusters and indirectly, contribute to national economic growth. Yet the task of transferring knowledge from universities to industries has proven far more complex than this perspective assumes.

In reality, universities fulfill at least two essential roles in the knowledge-based economy – the performance of research and the training of highly qualified personnel. They thus act both as a primary source of 'knowledge workers', as well as the key factor of production – knowledge itself. However, a number of changes in other elements of the innovation system have placed new demands and stress on the way in which the university performs these roles. The 'social contract' for

science, forged in the aftermath of World War II, saw society willing to fund massive investments in basic research in the expectation of long-term economic benefits, while leaving the principal research institutions, the universities, autonomous in the conduct of that research. The social contract for science in postwar society implied a high degree of autonomy for the realm of science, vigorously reinforced by the 'boundary work' of the scientific community itself; it afforded 'expert' status to the role of scientists in the exercise of judgment about most matters relating to the conduct of scientific investigations and the application of the resulting knowledge; and it privileged the role of the universities and other public research organizations as the principal site for the conduct of scientific research, although these arrangements exhibited considerable variation across national innovation systems (Martin 2003).

Underlying this view of the social contract for science was the 'linear model' of innovation that supported the development of postwar science policy in the US. The model defined the relationship between basic research and more applied forms of technology development as a linear one, involving the progression through a sequence of steps leading eventually to product development – the final stage involving the systematic adoption of research findings into useful materials, devices, systems, methods and processes. The entire sequence was referred to as the process of technology transfer in an early report of the National Science Foundation. In the idealized linear model, the innovation process commences with basic research conducted without any thought of potential application that leads to discoveries. These discoveries, in turn, open up the possibility of potential applications that are pursued, usually by firms, through applied research, development, design, production and marketing. The latter stages in this sequence lead to the successful commercialization of the resulting products and processes (Brooks 1996, 21; Stokes 1997, 10-11).

But the essential elements of the social contract for science have been subject to increasing strain in the past two decades as the linear model of innovation has been open to question. These developments are a consequence of major shifts in the relationship between the university and other constituent parts of the national innovation system. The shift results from the modification of the

lines demarcating the university from other institutions in society, reflecting the massification and democratization of the post-secondary education system; a questioning of the role of universities and their individual disciplines as the sole, or even primary source, of scientific expertise; the growing internationalization of scientific communities facilitated by the adoption of information and communication technologies; a greater involvement of industry with university research; an increase in interdisciplinary research and a shift in the emphasis of government funding from basic to more applied research; and finally, a greater expectation that university-based research lead directly to commercializable results (Wolfe 2003).

Increased demands on universities to support the innovation process are partly a consequence of changes in the nature of innovation patterns in the business sector that have limited the ability of private firms to support basic research. Under competitive pressure to introduce new products, processes and services more quickly, many large corporations have restructured their R&D operations to link research programs more tightly with product development processes. Broader-based inquiries into fundamental science have consequently been scaled back in many firms. At the same time, the globalization of R&D and more widespread sharing of knowledge among researchers and business in different countries do not appear to have diminished the importance of a strong domestic knowledge base, or the role of universities/government in helping create it.

The universities have come under increasing pressure in recent years to expand their traditionally dominant role in the conduct of basic research and to supplement with more applied research activities, frequently based on university-industry partnerships. The changes impacting on the university system are characterized by three trends: 1) the linking of government funding for academic research and economic policy; 2) the development of more long term relationships between firms and academic researchers; and 3) the increasing direct participation of universities in commercializing research (Etkowitz and Webster 1998). Universities are now expected to generate more applied knowledge of greater relevance to industry, to diffuse knowledge, and provide technical support to industry. This shift reflects the change in the nature of business R&D described

above, but it is also the result of a parallel expectation on the part of government that their investments in basic research should produce a higher economic return. It is reinforced by the political expectation that research funding be tied to broader public policy objectives about promoting national innovative capacity, greater competitiveness and, increasingly, local and regional economic development.

While the shift in policy perspective was partly stimulated by a questioning of the assumptions underlying the linear model, it has yet to be replaced with a more complex and realistic appreciation of the way in which knowledge flows between universities and industry. Conventional approaches to the issue of knowledge flows frequently treat knowledge itself as a universally available commodity, virtually as a free public good, and knowledge transfer as a commercial and legal transaction between clearly defined agents. This view simplifies the complex nature of scientific knowledge and the linkages and processes that facilitate knowledge flows across institutional boundaries and enable firms to absorb and employ that knowledge. Evidence from a growing number of sources, including studies of the economics of innovation and studies of regional innovation systems, suggest that successful knowledge transfer depends on the type of knowledge involved, and how it is employed. While linkages between universities and industry have proliferated in the past decade and a half, our understanding of the process by which knowledge is transferred from one to the other has not kept pace. As Fumio Kodama and Lewis Branscomb argue,

> . . . disappointment awaits those who expect quick results from university-based high-technology strategies for industrial renewal. First-rank research universities can and most often do make a large and positive contribution to economic performance, regionally and nationally. But to understand the effects we should not focus on the style and content of the transactions with firms but rather look at the university as a pivotal part of a network of people and institutions who possess high skills, imagination, the incentive to take risks, the ability to form other networks to accomplish their dreams (1999, 16).

The Relationship between Research and Innovation

The preceding discussing suggests that the relationship between publicly funded research and the innovation process is far more complex than that assumed by many recent public policy discussions of the role of the university in the commercialization of scientific research. A more accurate understanding of this role requires a sophisticated framework for analysing the character of the institutional and interpersonal linkages between universities and firms and how those linkages contribute to knowledge transfers between the two. An alternative approach to assessing the economic benefits that flow from knowledge transfer focuses on the properties of knowledge not easily captured by the informational view associated with early work on the economics of basic research and the linear model. Keith Pavitt stresses that scientific and technological knowledge often remains tacit, i.e. person embodied in the knowledge, skills and practices of the researcher (Pavitt 1991). Other scholars in the tradition of evolutionary economics describe knowledge as dynamic, often unarticulated, and claim that firms must invest substantial resources to capture and employ it. This view shifts attention from the applicability of knowledge to the processes that enable a firm to successfully absorb and apply that knowledge.

Pavitt argues that inherent in the traditional rationale for public support of basic research is the danger of confusing the notion of science as a public good (i.e., codified, published, easily reproducible) with science as a free good (i.e., costless to apply as technology). He builds on Nathan Rosenberg's claim that to assimilate and benefit from external research, firms have to develop a considerable capacity for research themselves (Rosenberg 1990). Pavitt maintains that knowledge transfers are mainly person-embodied and that policies that attempt to direct basic research towards specific goals or targets ignore the considerable indirect benefits across a broad range of scientific fields that result from training and unplanned discoveries. This introduces the notion of knowledge as the capacity to acquire and apply research results, rather than as an end in itself. In this perspective, knowledge is the ability to put information to productive use. It provides the basis for understanding new

ideas and discoveries and places them in a context that enables more rapid application. The development of such internalized or 'personal knowledge' (Polanyi 1962) requires an extensive learning process. It is based on skills accumulated through experience and expertise. It also emphasizes the learning properties of individuals and organizations. Of crucial importance are the role of skills, the networks of researchers, and the development of new capabilities on the part of actors and institutions in the innovation system.

Analyzing this process from the perspective of the firm, Cohen and Levinthal (1990) argue that the process of knowledge transfer from universities and research institutes is strongly conditioned by the capabilities of firms. Firms need to build an internal knowledge base and research capacity to effectively capture and deploy knowledge acquired from external sources. The ability to exploit external knowledge is a critical component of a firm's innovative capabilities. The ability to evaluate and utilize outside knowledge is largely a function of the level of prior, related knowledge within the firm. This prior knowledge includes basic skills or even a shared language, but may also include knowledge of the most recent scientific or technological developments in a given field. These abilities collectively constitute a firm's 'absorptive capacity'. The overlap between the firm's knowledge base and external research allows the firm to recognize potentially useful outside knowledge and use it to reconfigure and augment its existing knowledge base. Research shows that firms which conduct their own R&D are better able to use externally available information. This implies that absorptive capacity may be created as a by-product of the firm's own R&D investment. A key implication of this argument is that firms require a strong contingent of highly qualified research scientists and engineers as a prerequisite to the ability to absorb and assess scientific results, most frequently recruited from institutions of higher education. The members of this scientific and engineering labour force brings with them not only the knowledge base and research skills acquired in their university training, but often, more importantly, a network of academic contacts acquired during their university training. This

underlines Pavitt's point that the most important source of knowledge transfer is person embodied.

Knowledge Transfer from Universities

One of the difficulties with understanding the nature of the relationship between university-performed basic research and firm-based innovation is that it avoids the question of how firms in different industry sectors deploy scientific knowledge in the innovation process. One study that cast some light on this question was the Yale survey conducted by Richard Nelson and several colleagues in the early 1980s. It queried 650 R&D managers in US firms, representing 130 lines of business. It distinguished between two roles that science plays in supporting innovation: one as an expanding pool of theory and problem-solving techniques deployed in industrial R&D, but not necessarily new science; the other as a direct source of new technological possibilities pointing the way towards new solutions to old problems. Overall, university-based research in a field was reported by the R&D managers as much less important to recent technical advance in industry than was the overall body of scientific knowledge in the field. In most fields, academic research does not provide pilot inventions, but the broad understandings and techniques that industry can later employ for a variety of different purposes. Industrial R&D managers also reported that they value the scientific background and training of their R&D staff more highly than the current research activities of university-based researchers (Klevorick, Levin, Nelson, et al. 1995). Nelson expands on the reason why research activity with a direct impact on industrial innovation is limited in research organizations that specialize in the conduct of R&D, such as university research laboratories,

> To do effective industrial R&D generally requires knowledge about the technology of an industry that is not taught in school. It also often requires a certain amount of close and not preprogrammable interaction between the lab and client firm or firms, and complementary work and investment on their part. . . . Thus effective lab

> work requires not only industry-specific, but firm specific, knowledge and sensitivity of the lab to the needs of its client firm (Nelson 1996, 62).

The findings of the original Yale survey are broadly supported by a more recent survey of industrial R&D managers conducted at Carnegie Mellon University in 1994 (CMS). The results of the Carnegie Mellon Survey (CMS) reinforce the notion that industrial firms draw upon feedback from their own customers and manufacturing operations as the primary source of ideas for new product and process innovations. Public research is significant in addressing previously identified needs or problems, rather than suggesting new lines of innovative activities, with the exception of a select few industries, such as pharmaceuticals, that draw directly upon the public research base. However a significant proportion, almost a third, of industrial R&D projects do make use of public research findings and the authors of the study argue that knowledge from public research findings beyond this stated level is transmitted to industrial researchers through a wide range of supplementary channels, such as consulting and informal communications. This insight is supported by an additional finding that the most important mechanisms for communicating research results from public research institutes to industry are the traditional ones of publication and conferences, strongly complemented by informal exchanges and private consulting arrangements between firms and researchers (Cohen, Nelson, and Walsh 2003, 139-41).

The findings of the Carnegie Mellon Survey reinforce the perspective that a key aspect of the process of knowledge transfer from universities and research institutes is through personal connections and that the knowledge being transferred is thus ‘tacit’ and ‘embodied’. To deploy university-generated knowledge in a commercial setting, firms need to capture both its tacit, as well as its more explicit, or codified, component. Another study by Wendy Faulkner and Jacqueline Senker employed a somewhat different research methodology designed to analyse this dimension of knowledge transfer in greater detail. This study explored the relationship from the perspective of the innovating organization, focusing on

its knowledge requirements and trying to develop a better understanding of the knowledge flows from academia to industry. The researchers conducted interviews with a number of managers in firms across three science-related industries, biotechnology, engineering ceramics, and parallel computing. They probed for links between the firms and universities and the types of knowledge flowing to the firms. They also attempted to determine the degree of formality of these links and the relative importance of tacit versus codified knowledge. While the findings differ slightly by industry, they conclude that partnering with universities contributes most to firm innovation through an exchange of tacit knowledge and that the channels for communicating this knowledge are often informal. Such informal linkages are both a precursor and a successor to formal linkages and many useful exchanges of research materials or access to equipment take place through non-contractual barter arrangements. The flexibility inherent in such arrangements promotes the goodwill between partners that supports more formal linkages (Senker 1995).

Proximity and Spillovers in Knowledge Transfer

The preceding analysis emphasizes the fact that knowledge transfer between universities and their partners are highly personalized and, as a consequence, often highly localized. This underscores the significance of geographical proximity for the process of knowledge transfer. Proximity to the source of the research is important in influencing the success with which knowledge generated in the research laboratory is transferred to firms for commercial exploitation, or process innovations are adopted and diffused across developers and users. A growing body of empirical research reinforces the finding that the linkages and benefits that flow from public investments in basic research are localized in this manner. The most frequently cited explanation for this proximity effect is the need to gain access to tacit knowledge, or at least knowledge that is not yet codified. Conversely, the role of proximity declines when useful knowledge is readily available in more codified forms that can easily be transmitted and accessed across broad distances. Proximity may also be more important for the transfer of relatively new research results in science-based fields, where personal access

to those conducting the research is critical for the effective transfer of its insights (Feldman 2000; Adams 2001; Arundel and Geuna 2001).

One prominent line of research has investigated the geographic spillovers from government funding of scientific research to other types of activities, such as industrial R&D. Access to the US patent office data base enabled researchers to assemble large volumes of patent data with geographic precision. These data provide a rich geographic time series which has been further broken down into patent families, patents that reference or cite each other and are used to indicate the flows of knowledge from one intervention to another. Using patents as a proxy for innovative output, Jaffe related the incidence of patents assigned to various corporations in different states with industrial R&D and university research. He found an important indirect or induced effect. There is also an association between industrial R&D and university research at the state level (Jaffe 1989). In a subsequent study, Acs et al (1991). replaced the number of patents with the number of announcements of new or improved products found in newspapers and trade journals. Their analysis indicated that spillovers from university research to industrial innovation were greater than Jaffe described.
Using the same data as Acs, Feldman and Florida's model showed that the process of innovation is highly dependent on the underlying technological infrastructure of an area, consisting of both university and industrial R&D, agglomerations of related firms and business services. Furthermore, these innovative capabilities tend to be highly specialized in regional concentrations of distributed across the US. "In the modern economy, locational advantage in the capacity to innovate is ever more dependent on the agglomerations of specialized skills, knowledge, institutions, and resources that make up the underlying technological infrastructure" (Feldman and Florida 1994, 226).

Jaffe et al (1993). also used patent citations to analyze the spillover effects of academic research. The results indicated that knowledge flows from universities to firms are highly localized at the regional or state level. They found evidence that patents cite other patents

originating in the same city more frequently. Citations are five to ten times as likely to come from the same city as the control patents. This research highlights some of the factors that condition localization. Citations are more likely to be localized in the first year following the patent. This effect fades with time: citations show fewer geographic effects as knowledge diffuses. In a slightly different approach, Audretsch and Feldman (1996) used innovation citations that represent the market introduction of new commercial products. These data consist of new product announcements compiled from technology, engineering, and trade journals. They found a direct relationship between the propensity for industries to concentrate geographically and the knowledge intensity of the industries' activity. They also used survey data to discern the disciplines that form a common science base that contribute to cross-industry increasing returns. This work found that industries relying on the same science base also tend to cluster geographically.

Knowledge Transfer and Cluster Formation

The proximity effect of knowledge transfer provides a strong clue as to why universities are increasingly seen as an essential element to the process of regional economic development and for stimulating the formation of clusters, especially in knowledge-intensive industries, such as information and communications technology or biotechnology. But a critical issue that has been less well explored in the literature involves both the degree to, and the way in, which the proximity effect of university research on innovativeness contributes to the process of cluster formation. This is a point that has more frequently been assumed in much of the literature, rather than studied systematically. A critical issue involves the question of which of the university's central roles in the knowledge-based economy – the performance of scientific research and the training of highly qualified personnel – exert the dominant influence on the process of regional economic development and cluster formation. Clusters are defined as "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities" (Porter 1998, 199). They can include concentrations of interconnected companies, service

providers, suppliers of specialized inputs to the production process, customers, manufacturers of related products and governmental and other institutions, such as national laboratories, universities, vocational training institutions, trade associations and collaborative research institutes.

The mutually beneficial activities of the firms in a cluster generate a number of cluster assets that can be viewed as quasi-public goods. The general level of knowledge and information built up in the cluster can act as such a good, if the level of trust is sufficient to generate an easy and mutual exchange of both tacit and codified knowledge. Similarly, the mobility of personnel between firms in a cluster can constitute a similar source of knowledge flows. Even more important, the strength of the cluster can provide an important stimulus to public investment in specialized infrastructure, such as communication networks, joint training and research institutions, specialized testing facilities and the expansion of public laboratories or post-secondary educational institutions. As the depth and value of such investments increase, so do the economic benefits flowing to firms located in the cluster. Thus the strength of the cluster and its supporting infrastructure of quasi-public goods and public institutions create a mutually reinforcing positive feedback loop (Porter 1998, 218-19).

Clusters have an additional effect on improving the capacity of member firms to innovate and thus enhance their potential for productivity growth. Membership within the cluster affords firms a clearer view of current and prospective technology trends, allowing them to identify more rapidly new market opportunities for product or process enhancements through better information about buyer needs. On the supply side of the equation, cluster participation provides the firm with early information about new technology trends, component and machinery capabilities, allowing them to perceive opportunities for improving or enhancing their own products or firm capabilities. Even more important than these valuable sources of information, membership in the cluster allows firms to act quickly by providing them with the ready source of supply that they need to bring new products or

services to the market. These advantages are strongly reinforced by the competitive pressure that comes with location in the cluster. The presence of multiple rivals in the cluster, competing to take advantage of similar market opportunities and supply capabilities, pushes firms to excel at the innovative process. However, these internal competitive pressures are strongly reinforced by the potential for cooperation. Competition and cooperation are both present within the cluster because they work on different dimensions and between different economic actors (Porter 1998, 220-23; Best 1990).

A number of recent studies have also identified the finding and retaining of talent as a critical factor influencing the development of clusters and the growth of dynamic urban economies. Locations with large talent pools reduce the costs of search and recruitment of talent – they are also attractive to individuals who are relocating because they provide some guarantee of successive job opportunities. In Richard Florida's interviews, numerous executives confirmed that they will "go where the highly skilled people are". Highly educated, talented labour flows to those places that have a 'buzz' about them – the places where the most interesting work in the field is currently being done. One way to track this is through the inflow of so-called 'star scientists', or by tracking the in-migration of tomorrow's potential stars (post-docs). Another approach, employed by Florida and colleagues (Florida 2002; Gertler, Florida, Gates, et al. 2002) utilizes a more broadly defined measure of 'talent', and documents its strong geographical attraction to the presence of other creative people and activities locally. In-bound talented labour represents knowledge in its embodied form flowing into the region. Such flows act to reinforce and accentuate the knowledge assets already assembled in a region.

Knowledge and Learning in Clusters

Much of the literature on the economic benefits of clusters stresses the fact that the key advantages are derived from the agglomeration economies afforded by the cluster. These agglomeration economies arise primarily from the ready access afforded to firms by co-

locating with key suppliers. Porter stresses that the location of a firm within a cluster contributes to enhanced productivity by providing it with superior or lower cost access to specialized inputs, including components, machinery, business services and personnel, as opposed to the alternative, which may involve vertical integration or obtaining the needed inputs from more remote locations. Sourcing the required inputs from within the cluster reduces the need to maintain costly inventory and the consequent delays that can arise with shipments from distant locations. It also facilitates communication with the key suppliers in the sense that repeated interactions with the supply firms in the value chain creates the kind of trust conditions and the potential for conducting repeated transactions on the basis of tacit, as well as more codified, forms of knowledge. Clusters also offer distinct advantages to firms in terms of the availability of specialized and experienced personnel. The cluster itself can act as a magnet drawing skilled labour to it or conversely the location of specialized training and educational institutions in the region provides a steady supply of highly qualified labour to the firms in the cluster (Porter 1998).

While not diminishing the importance of these agglomeration economies, a more recent stream of analysis suggests that the underlying dimension which confers competitive advantages on the firms located in the cluster is ready access to a common knowledge base. The central argument in this literature is that the joint production and transmission of new knowledge occurs most effectively among economic actors located close to each other. Proximity to critical sources of knowledge, whether they are found in public or private research institutions or grounded in the core competencies of lead or anchor firms, facilitates the process of acquiring new technical knowledge, especially when the relevant knowledge is located at the research frontier, as in the field of biotechnology research, or involves a largely tacit dimension. Knowledge of this nature is transmitted most effectively through interpersonal contacts and interfirm mobility of skilled workers. From this perspective, “a key feature of successful high-technology clusters is related to the high level of embeddedness of local firms in a very thick network of knowledge sharing, which is

supported by close social interactions and by institutions building trust and encouraging informal relations among actors" (Breschi and Malerba 2001, 819). This argument is strongly supported by the empirical findings of the literature on the impact of proximity on knowledge flows, discussed above.

Building on this stream of the literature, Peter Maskell has proposed that we require a knowledge-based theory of the cluster, but extends this approach to both high-technology and conventional clusters. He suggests the primary reason for the emergence of clusters is the enhanced knowledge creation that occurs along two complementary dimensions: the cluster affords firms benefits along a horizontal dimension through the reduced costs of coordinating dispersed sources of knowledge and overcoming the problems of asymmetrical access to information for different firms; as well as facilitating the actual flow of knowledge between firms along the vertical dimension. The horizontal dimension of the cluster consists of those firms that produce similar goods and compete with one another. The advantages of proximity arise from continuous monitoring and comparing of what rival firms are doing, which acts as a spur to innovation as firms race to keep up with, or get ahead of, their rivals. The vertical dimension of the cluster consists of those firms that are complementary and interlinked through a network of supplier, service and customer relations. Once a specialized cluster develops, firms within it increase demand for specialized services and supplies Further, once the cluster has emerged, it acts as a magnet drawing in additional firms whose activities require access to the existing knowledge base or complement it in some significant respect (Maskell 2001, 937).

A knowledge-based theory of the cluster necessitates an awareness of the fact that knowledge flows present in a cluster frequently involve a combination of both local and global sources. Bathalt, Malmberg and Maskell maintain that successful clusters are effective at building and managing a variety of channels for accessing relevant knowledge from around the globe. However, the skills required when dealing with the local environment are

substantially different than the ones needed to generate the inflow and make the best use of codified knowledge produced elsewhere and these differences must be managed by the cluster. They maintain that an accurate model of the knowledge-based cluster must account for both dimensions of these knowledge flows (Bathalt, Malmberg, and Maskell 2002). They refer to these two kinds of knowledge flows as *local buzz* and *global pipelines* respectively. According to Storper and Venables buzz arises from the fact of physical co-presence. It incorporates both the broad general conditions that exist when it is possible to glean knowledge from intentional face-to-face contacts, as well as the more diffuse forms of knowledge acquisition that arise from chance or accidental meetings and the mere fact of being in the same location. Buzz is the force that facilitates the circulation of information in a local economy or community and it is also the mechanism that supports the functioning of networks in the community (Storper and Venables 2003, 32). Pipelines refer to channels of communication used in distant interaction, between clusters and external sources of knowledge. Important knowledge flows are generated through network pipelines. The effectiveness of these pipelines depends on quality of trust that exists between the firms in the different nodes involved. The advantages of global pipelines derive from the integration firms located in multiple selection environments, each of which is open to different technical potentialities. Access by firms to these global pipelines can feed local interpretations and the usage of knowledge that developed elsewhere into a cluster. Firms need to access to both local buzz and the knowledge acquired through international pipelines. The ability of firms to access such global pipelines and to identify both the location of external knowledge and its potential value depends very much on the internal organization of the firm, in other words, its 'absorptive capacity'. The same can be said of local and regional clusters (Bathalt, et al. 2002).

Path Dependency and the Creation of Clusters

According to a number of observers, clusters are seeded by a variety of methods; however, their growth can only be facilitated by building upon existing resources. There is

considerable disagreement over whether they can be built just anywhere from scratch. The key assets that determine the viability of a cluster are firm-based. Of particular importance is the emergence of an anchor firm for the cluster. Whole clusters can develop out of the formation of one or two critical firms that then feed the growth of numerous smaller ones. Examples of the role played by this kind of anchor firm can be found in the case of MCI and AOL in Washington, DC, or Nortel in Ottawa, or NovAtel in the case of the Calgary wireless cluster. In other instances, the presence of major anchor firms in a local cluster can act as a magnet, attracting both allies and rivals to locate in the region to monitor the activities of the dominant firm. This is the case with San Diego, where Nokia, Ericsson and Motorola have all located their CDMA wireless research efforts to benefit from Qualcomm's leadership in the field or in Ottawa, where Cisco and Alcatel both acquired local firms to benefit from the optical and telecommunications expertise in the region. This process can require decades to take root, a point not well recognized by many of the localities currently engaged in developing cluster strategies. And while universities and public research institutes can play a supporting role in the development of the cluster, as was the case with the NRC's laboratories and the Communications Research Centre in attracting the Bell Northern Research Laboratories to Ottawa, or UC San Diego as home to the research that led indirectly to the founding of Qualcomm, the role is far less direct or instrumental than is often presumed. Other analysts emphasize the role that highly skilled labour, or a unique mix of skill assets, often produced by the post-secondary educational institutions, play in seeding the growth of a cluster. However, this process also requires a long time to take root.

The presence, or absence, of key institutional elements in a local or regional economy may affect both their innovative capacity and their potential to serve as nodes for cluster development. Other studies underscore the importance of local governments and economic development agencies adopting sustained development strategies and key role played by civic entrepreneurs in those strategies. Similarly, the ability, or inability, of the local or regional economy to develop the underlying conditions of trust and social capital that contribute to the presence of a learning economy may inhibit its capacity to sustain the

growth of dynamic clusters. A critical question that remains unexplored through most of this literature is how the conditions that influence the trajectory of growth for specific regional or local economy can be altered by direct intervention.

Many clusters enjoy the knowledge assets and research infrastructure that are necessary for the development of an innovation-based development strategy, but they differ dramatically in their capacity to mobilize these assets in the pursuit of such a strategy. Similarly, experience suggests that local communities can formulate strategies to alter their economic trajectory and improve their chances of economic development. The successful initiation of this kind of process depends upon the ability to collaborate across boundaries – both geographic and social. Even in established clusters, the mere concentration of a large number of firms is not sufficient to transform a particular locale into a vibrant and dynamic regional economy. It also requires the presence of an 'economic community' – strong, responsive relationships between the economy and community that afford both companies and the community a sustained advantage. These relationships are mediated by key people and organizations that bring the economic, social and civic interests in the community together to collaborate (Henton, Melville, and Walesh 1997). Henton and his colleagues argue that social capital is a critical ingredient in the success of the most dynamic clusters and regional economies. Social capital *can* be created and the basis for doing so is the establishment of collaborative networks between various elements of the business and civic communities, including the university research institutions.

> The presence of *collaborative institutions and organizations*, such as cluster organizations, professional networks, research-industry consortia and entrepreneurial support networks, greatly facilitates this environment. These alliances, networks and other relationship-building mechanisms create connections and linkages vital to economic development in a technology-driven world. . . . many regions fortunate enough to have university research assets underuse these knowledge economy resources, precisely because relationships have not been

> established to connect the university and local industry. . . . Relationships matter (Montana, Reamer, Henton, et al. 2001, 10).

Successful clusters are built on local institutions of collaboration, which are formal, and informal organizations that facilitate the exchange of information and technology, and foster cooperation and coordination. They create social capital and improve competitiveness within clusters by creating relationships and establishing trust, facilitating the organization of collective action, developing collective institutions that benefit the members of the cluster, identifying common strengths or mutual needs and contributing to the development of a common economic agenda. Collaborative organizations and institutions embody values and attitudes that are intrinsic to the region. This element of the regional culture is an important, but overlooked, component in the design of cluster development strategies. The essential criterion for success is finding the appropriate mechanisms to engage key members of the community in a sustained effort to advance its opportunities. The recruitment of a committed, creative and collaborative leadership is the most essential element for the success of a strategic planning process in regional economic development. These collaborative leaders share certain characteristics: they can see the opportunities opened by the emergence of the knowledge-based economy; they exhibit an entrepreneurial personality, in both a business and a 'civic' sense; they are willing to cross functional, political and geographic boundaries in pursuit of their strategic goals and they are committed to, and comfortable working in teams (Montana, et al. 2001, 31-35). Universities can, and have played, a critical role as sources of this dynamic, farsighted community leadership and in building collaborative institutions at the local level.

Universities as Knowledge Poles for Cluster Development

As we saw at the outset, the mere presence of leading research universities in a community is not sufficient to stimulate the formation of a dynamic and innovative cluster, or sustain the process of regional economic development. However, their presence can play a vital role in contributing to cluster development. That role should not be viewed simply as a source of scientific ideas for generating new technology to transfer to private firms, or as a source of new firm formation as

research scientists spin findings out of their laboratories into new startups. While successful research universities perform these functions, overall they play a more fundamental role as providers and attractors of talent to the local and regional economy and as a source of civic leadership for the local community.

At the same time, communities located around the research institution cannot simply rely upon the presence of a leading research university as the 'engine of innovation' that will drive economic growth in their region. They must display both the capacity to absorb and utilize the knowledge and the skilled labour produced by the institution – in other words, a 'regional absorptive capacity' (Mallet 2002, 605) – and the social cohesion to build an economic community around their research infrastructure. Ultimately, the most valuable contribution that universities make to this process is as providers of high skilled labour, or talent. If knowledge is rapidly becoming the central factor of production in the emerging economy, the ability to absorb and use that knowledge, or to learn is the most essential skill or process. Learning processes are eminently person embodied in the form of talent. "Universities . . . are a crucial piece of the infrastructure of the knowledge economy, providing mechanisms for generating and harnessing talent" (Florida 1999, 72)

This means that the role of public policy in seeding cluster development, particularly as it applies to the research intensive universities is critical. The impact of public sector interventions on cluster development can be positive, negative or inadvertent in character. On balance, however, the public interventions which have the most effect in seeding the growth of clusters are those that strengthen the research infrastructure of region or locality and contribute to the expansion of its talent base of skilled knowledge workers. These points were strongly emphasized in a recent report prepared for the Ontario government,

> Basic university research advances fundamental understanding and provides a substantial rate of economic return through the preparation of a highly skilled workforce, contributing to the foundation of many new technologies, attracting long-term foreign (and domestic) investment, supporting new company development

> and entrepreneurial companies and participating in global networks. Government funding is the primary support for virtually all investment in truly frontier university research (Munroe-Blum 1999, 14).

Recent research on the growth and development of three major information and communications technology (ICT) clusters in Ontario – Ottawa, Toronto and Waterloo – documents the important contribution made by the research infrastructure in all three communities, both public research laboratories and post-secondary educational institutions (Wolfe 2002). However, the findings underline the fact that direct seeding of the cluster by postsecondary institutions is the exception, rather than the rule. The case studies of the three clusters suggest that the presence of universities and research institutes act primarily as attractors of inward investments by leading anchor firms interested in tapping into the knowledge base of the local community, or its *local buzz*, and as providers of the talent pool that firms in the cluster draw upon, rather than as direct initiators of cluster development. In this respect, universities also act as part of the network linking actors in the local cluster to the *global pipelines* that are also essential to the knowledge flows in the cluster. Successful research universities also attract leading scientists further reinforcing their linkages to external knowledge flows through the extensive network of contacts they bring to their new location.

Several examples from the case studies serve to illustrate this point. Among the three cases, the one which most clearly represents a central role for the university is Waterloo. All accounts of the origins of this cluster link its roots to the farsighted vision of a key group of business leaders to create a new university in the region in the late 1950s in a period when the provincial government (with financial support from the federal government) was expanding the post-secondary education system. Even more influential were subsequent decisions to focus the core strengths of the university in the sciences and engineering and to establish what has become one of the most successful co-op education programs in North America. The founders of many of the firms that populate this cluster are graduates of the university and many started their companies with core technologies developed

while they were at the university. Even the most internationally successful of these firms maintain their primary research base in the Waterloo area because of their ability to draw upon a highly trained group of science and engineering graduates from the university.

An illustration of the inadvertent role that public policy can sometimes play is provided in the case of the telecommunications cluster in Ottawa which originated partly with the judicial decision in the US to force the Western Electric Company to divest itself of its subsidiary, the Northern Electrical Manufacturing Company (now Nortel) in the late 1950s. Cut off from its sources of innovation and research, Northern Electric searched for a location to establish its own facility. It eventually bought a substantial tract of land on the outskirts of Ottawa to be the home of Bell Northern Research, largely because it viewed the presence of the National Research Council laboratories and the Communications Research Centre in the nation's capital as a substantial draw for the highly skilled research scientists and engineers it expected to populate its research facility. Many of the leading entrepreneurs in the Ottawa telecommunications and photonics cluster began their careers as researchers for BNR or another subsidiary, Microsystems International. Although the research universities played a secondary role the official genealogy of Ottawa high tech companies credits Carleton University with contributing substantial to the development of firms in the community.

> The Ottawa story emphasizes the critical importance in cluster development of deeply rooted R&D strength. It also clearly underscores the fact that access to technology demands the presence of world-class scientific research institutions. Only through the combined impact of public and private sector research activity could Ottawa have spawned its own homegrown high-tech industry (Mallet 2002, 6).

In a series of interviews conducted for the case studies, universities were identified as a source of strength for the sector, both in terms of their ability to provide a steady stream of highly skilled personnel, a prime driver of sector growth in Ontario, as well as a strong base of research with close links to industry.[1] Industry representatives feel that specific programs

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[1] The following discussion draws upon a number of confidential interviews with business, education and industry association leaders conducted as part of a study of ICT clusters in Ontario (Wolfe 2002).

such as the coop programs at Waterloo and others have been effective at moving students into industry settings. In addition to providing a strong talent base for firms located in the clusters to draw upon, the university research infrastructure is important for the clusters in two additional respects – one as a key source of new ideas for domestic companies, both in terms of spin-offs and knowledge transfer; and second, as a factor contributing to the reputation of the key clusters, in Ottawa, the Greater Toronto Area and in Waterloo, thus helping to attract large foreign firms to invest in the province. The case of Cisco (both with respect to the Ottawa cluster and more recently Waterloo) is widely cited as the most significant inward investment to the regional clusters, but Alcatel, Lucent and other leading IT were also mentioned. Most recently IBM, with one of its Centres for Advanced Studies located in its software laboratories in Markham, just north of Toronto, has expanded its presence in the Ottawa cluster as well. Through the acquisition of two local software companies – Tarian Software and Rational Software Corporation – it tripled the size of its Ottawa laboratories to 300 people. This expansion was furthered with the opening of a new Centre for Advanced Studies in the Ottawa laboratories to give graduate students from Carleton and the University of Ottawa experience in working with experienced software engineers in the development of new programs for database management (Pilieci 2003). The growing presence of these large multinational players is seen as evidence that the Ontario clusters have emerged as a major player on the international scene due, in part, to the growing reputation of their research infrastructure.

Many companies are expanding their investments in the university research base; through direct funding of basic research, affiliation with federal and provincial Centres of Excellence or partnering on more applied research initiatives. Companies cite the positive benefits that have flowed from recent federal and provincial increases in university funding through programs such as the Centres of Excellence, the Canada Foundation for Innovation or the Ontario Research and Development Challenge Fund. The two largest players in the sector, Bell Canada and Nortel Networks have both launched major research initiatives in the past

several years, principally at the University of Toronto and the University of Waterloo. In 2000, Nortel was funding $15 million of research at 11 Ontario universities and had invested an additional $18 million to create two dedicated institutes, the Nortel Institute of Optical Electronics at U. of T. and the Software Institute at the University of Waterloo. For its part, Bell Canada invested $35 million over three years in its Bell University Laboratories program at the Universities of Toronto and Waterloo. Although the level of Nortel research funding has declined in the recession, its strong links to the research base remain intact. Representatives of the business and industry association sectors cite the strong entrepreneurial culture at the University of Waterloo and the encouragement that faculty receive to develop and exploit their innovations as a critical factor in the growth of the ICT cluster in Canada's Technology Triangle. They agree emphatically on the driving role that the university's research base has played in the recent growth and expansion of the ICT cluster in their region. The region is currently reaping the benefits of investments in the post-secondary research and education base made in the late 1950s and 1960s.

While the Waterloo case suggests that farsighted investments in post-secondary education and the research infrastructure can seed cluster development, more often universities are followers, rather than leaders, in cluster formation – as they respond to the demands of local firms for an expanding talent pool by increasing their own teaching and research activities in areas of technical competence critical for the growth of those firms. One of the key factors cited repeatedly as crucial for the current and future well being of the ICT sector in Ontario is a continuing supply of highly skilled personnel. A number of new federal and provincial initiatives address this issue directly. Foremost is Ontario's Access to Opportunities Program with $150 million in new funding over three years, designed to increase the number of students enrolled in computer science and related engineering programs by 17,000 students a year. Virtually all the province's universities and colleges submitted proposals under this program and the Council of Ontario Universities noted that the universities exceeded the initial target, resulting in the creation of 23,000 new places. While employment in the sector

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Does your university have a strategy?

https://www.menti.com/kqjdmd373k

Or

www.menti.com (code: 2416 1437)

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The implementation process

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Why a strategy planning?

- Rapid changes require more critical assessments and innovative solutions
- Adaptability and agility are critical to success
- Setting up priorities, objectives and being aware of the available and required to achieve them
- The process…
- The document…

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Formal strategic document vs. strategic objectives

- Strategic document
  - Formal strategy published and adopted by the university
  - (Hopefully) followed by action plan and clearly disseminated among the lower management and staff

- Clear strategic objectives (without strategic document)
  - There is clearly communicated main objectives on what needs to be done (high quality in teaching, expected level of scientific publication, etc.).
  - There is no strategic document

Core components of the Penn State University' strategy

The Fundamentals

- Penn State's vision and mission statements, and institutional values

Six Foundations

- Integral to all that we do and everyone's responsibility to sustain

Five Thematic Priorities

- Key areas of strength and growth in teaching, research, and service
- Potential for meaningful impacts in the Commonwealth and beyond

Three Supporting Elements

- Pieces of equal importance required to achieve desired outcom

Source: PenState, 2016

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Elements of Oxford university‘s strategy

- Scope
- Mission
- Vision
- Education objectives and priorities
- Research objectives and priorities
- People / Staff / Human Resources
- Partnerships / Collaborations / Cooperation
- Resources / Finance

Source: Oxford University, 2018

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Strategic planning process

Source: PenState, 2016

Strategy planning types

- **Top-down**
  - Divergent, expectations based approach for aligning of the activities of the units.
  - The university bodies develops the priorities, objectives and actions based on research and analysis.
- **Bottom-up**
  - Convergent, capacity based approach for aligning of the objectives of the units.
  - The university bodies develops priorities, objectives and actions based on the units' plans.

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Strategy implementation responsibility layers

- **Committees**
  - On University level: Per topic / key priority
  - On faculty/unit level
- **Management**
  - Rector, vice-rectors for the related topics
  - Deans, vice-deans for the related topics
  - Institute / Department heads

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Getting and keeping everybody on board

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Create sense of ownership

- To keep people on board they need to know and feel that they are making a difference
- Include them in the development process
- Keep them informed on the progress
- Show gratitude
- Keep asking them

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Channels and approaches – Internal stakeholders

- Survey, interviews, roundtables and/or workshops to collect their ideas and to really implement them
- Regular pleasant events to inform them on the new developments (planes and results)
- Regular information (newsletters, e-mails, etc.)
- Connection of the strategy plan with their tasks planning

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Channels and approaches – External stakeholders

- Survey, interviews, roundtables and/or workshops to collect their ideas and to really implement them
- Regular information (social media, newsletters, etc.)
- Events (alumni gathering, industry partner meetings / conferences…)

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Steps for success

- Communicate the plans
- Connect the strategic goals to the everyday activities
- Keep stakeholders active and close

- **Plans will not be precisely implemented, but planning is crucial!**

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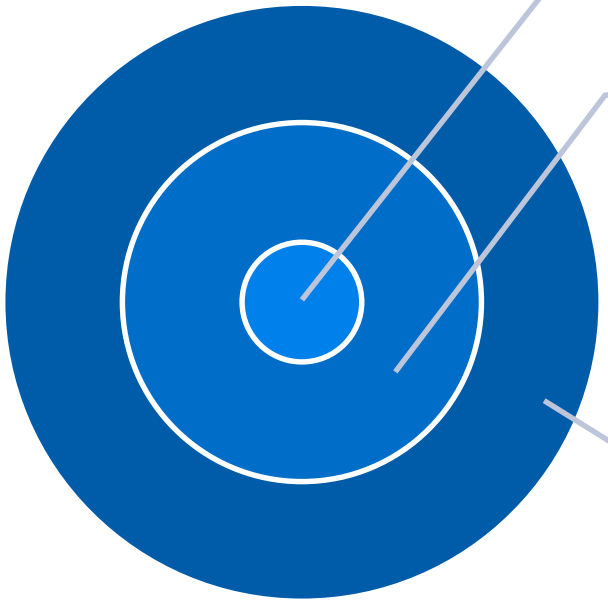
Main stakeholders (example)



Project consortium / Initiative partners

- Including different institutes and offices in the partners

Key stakeholders

- Companies and business / industry representatives
- Formal and non-formal education institutions and teachers
- Governmental institutions and NGOs

Other stakeholders

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Types of external stakeholders

- **National**
  - Companies
  - Governmental institutions
  - Non-governmental organisations and associations
  - Research (supporting) organisations and donors

- **International**
  - EU agencies, bodies and delegation
  - Partner universities

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Identifying key stakeholders

- Assumption: Internal key stakeholders are well known
- Select **divers group of representatives** from each type of internal stakeholders
- **Organise workshop(s)**
  - Moderate the workshop explaining the scope of the intervention
  - Define the groups of external stakeholders
- **Create database of stakeholders**
  - Ask all units and all internal stakeholder types to propose “nominees”
  - Collect contact info, relevance, responsible person to contact them

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Mobilizing key stakeholders

Preparation process

- **Create collaboration platform**
  - Offer services for curtain types of stakeholders
  - New relevant initative (hub, centre, or a network)
  - Donor funded project

- **Invite the relevant key stakeholders through the most suitable contacts**
  - Former classmates and teachers
  - Business representatives (chambers, clusters, etc.)
  - University / unit top management

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Mobilizing key stakeholders

Implementation

- **Organise event (workshop, roundtable…)**
  - Provide active participation
  - Clearly present their role in the future
  - Provide them with opportunity to make a difference

- **Keep them engaged**
  - Form relevant body where some of the key stakeholders will meet regularly
  - Provide services that bring value to them
  - Keep them in the loop

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Create self-perpetuating eco-system

- **Assure joint interest of all stakeholders (internal and external)**
  - Create value for all
  - Keep the ratio of engagement vs benefit positive for all
  - Keep them regularly engaged

- **<u>It is like riding a bicycle, if it stop moving it will fall</u>**
  - This referrers beyond perpetuating – following changes of society, needs and behaviours need to be embedded in the systems

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The GREENOVET Project

- Good practices of broad collaboration platforms (1/2) -

GREENOVET – European VET Excellence Platform for Green Innovation

Programme: Erasmus+ - KA3 Support for Policy Reform => Centers of Vocational Excellence
Duration: 1.11.2020 – 31.10.2024; **Budget:** 4.381.993 €; **EU grant:** € 3.505.595 €;

Overall objectives

- To boost Green Innovation in Europe
- To develop European best practice strategies for collaboration among VET providers at EQF Levels 4-8 and Green tech.
- To foster **environmental, social and economic development in Europe**, through green and sustainable innovation processes enabled by VET excellence
- To empower **VET graduates' long-term (self-)employability** in the changing future labour market landscape through the development of **an innovative, entrepreneurial and sustainable mind-set.**

Main deliverables

- International cooperation platform of Vocational Excellence in Green Innovation
- White paper on a model of the structure of regional Green Innovation CoVEs
- Development of an analysis tool for measuring innovation and education capacities of VET providers
- **Training programmes for teachers, lecturers and trainers in VET education**
- Setting up of an International QA for VET excellence in Green Innovation
- **Regional and international competitions in Green Innovation**

Consortium composition:

A. University (classical and FH) B. VET school C. Business representative / company

Austria (Styria)

A. FH Joanneum Gesellschaft mbH
A. Technische Universität Graz
B. HTBLuVA Graz-Gösting
C. Green Tech Cluster Styria GmbH
C. Wirtschaftskammer Steiermark
C. 3s Unternehmensberatung GmbH

North Macedonia (Skopje)

C. National Center for Development of Innovation and Entrepreneurial Learning
A. Ss. Cyril and Methodius University in Skopje
B. ASUC Boro Petrushevski
C. RADE KONCAR - TEP DOOEL Skopje
C. Macedonian Chambers of Commerce

Finland (Vaasa)

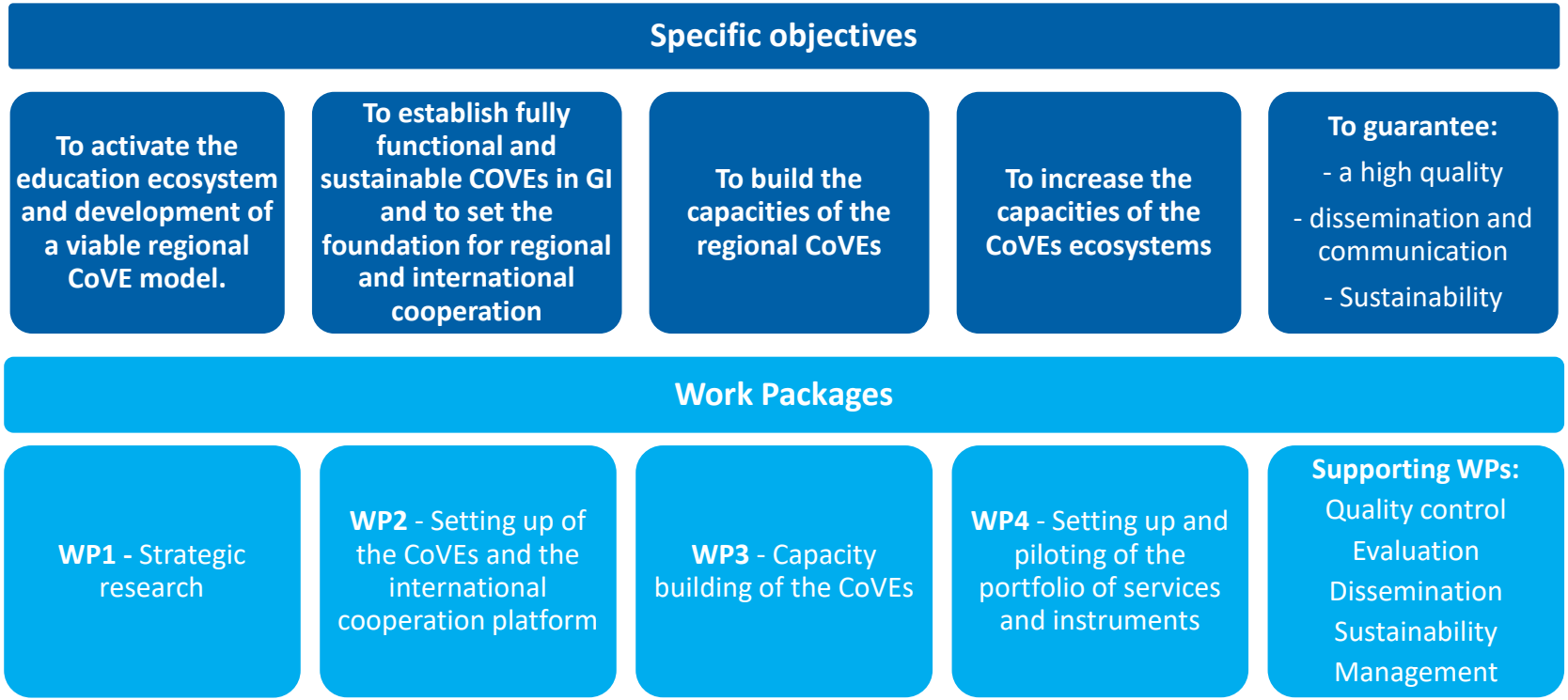
A. VAASAN YLIOPISTO
A. VAASAN KAUPUNKI
B. Ab Yrkeshögsskolan vid Åbo Akademi – Novia
C. Oy Merinova Ab

Portugal (Leiria)

A. Instituto Politécnico de Leiria – Polytechnic of Leiria
B. Pombal Prof – Sociedade de Educação e Ensino Profissional, S.A.
C. NERLEI - Associação Empresarial Região de Leiria

+ 15 associated partners

Specific project objectives



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WP1 - Strategic research

Duration: 1.11.2020 – 31.7.2021 | Lead: NCDIEL, Austrian coordinator: FHJ

T.1.1 Mobilising key stakeholders in the partner regions

Workshops/ round tables on regional VET perspective on integration for regional smart specialization strategy in regards to green innovation

Foundation document: Regional Committee for VET Excellence in Green Innovation

T.1.2 Measuring skills gaps in line with the Smart Specialization Strategies (S3)

Green Innovation in VET – status quo and challenges in the participating regions

T.1.3 Status quo analysis of enablers

White paper: Model of structure of regional Green Innovation CoVEs

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WP2 - Setting up of the CoVEs and the international cooperation platform

Duration: 1.5.2021 – 30.4.2022 | Lead: UKIM, Austrian coordinator: TUG

T.2.1 Developing 4 tailor-made concepts and strategies of the CoVEs	Concept and strategy for each regional CoVE	Workshops on Conceptualisation and strategy development of the regional CoVE	
T.2.2 Establishment of the 4 CoVEs	Centers of Vocational Excellence in Green Innovation		
T.2.3 Development of international cooperation platform of Vocational Excellence in Green Innovation	International platform strategy development workshop	International cooperation platform of Vocational Excellence in Green Innovation	Virtual international cooperation platform of Vocational Excellence in Green Innovation

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WP3 - Capacity building of the CoVEs

Duration: 1.2.2022 – 31.12.2022 | Lead: IPL, Austrian coordinator: FHJ

T.3.1 Design and conduction of trainings from world-class experts

- Trainings on "Portfolio development methods and techniques" and "Sustainability as built-in feature in the CoVEs"

T.3.2 Implementation of mutual learning processes among the CoVEs

- Peer-learning

T.3.3 Conduction Workshops for the CoVEs' wider teams

- Workshop: Opportunities of the integrated VET ecosystem
- Workshop 2: Green Innovation driven socio-economic development

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WP4 - Setting up and piloting of the portfolio of services and instruments

Duration: 1.9.2022 – 31.10.2024 | Lead: UVA, Austrian coordinator: TUG

T.4.1. Development of Portfolio of instruments and services	CoVE of Green Innovation portfolio of instruments and services			
T.4.2. Training programmes for teachers and trainers in VET education	Training programme for teachers and trainers in Green Innovation TVET			
T.4.3. Implementation of pilot projects with enterprises	Regional pilot projects with enterprises	Training on technical skills in Green Innovation	Training on "Entrepreneurship and digital skills in Green Innovation"	
T.4.4. Implementation of pilot projects in the international cooperation platform and international competitions	GREENOVET international cooperation pilot projects	Workshop: "Exchange of interim project results and lessons learnt"	GREENOVET international project week	International Competition in Green Innovation Excellence

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WP5 - Conducting quality control and monitoring of the project

Duration: 1.11.2020 – 31.10.2024 | Lead: VAMIA, Austrian coordinator: 3s

T.5.1 Setting up of the International Quality Assurance board for VET excellence in Green Innovation (IQA)	International Quality Assurance board for VET excellence in Green Innovation member selection criteria
T.5.2 Establishment of a quality assurance system	Quality assurance system
T.5.3 Formal and regular quality assurance reporting	
T.5.4 Conduct product (summative assessment) and process (formative assessment) quality control	Interim quality reports

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WP6 - Evaluation

Duration: 1.5.2021 – 31.10.2024 | Lead: 3S, Austrian coordinator: 3S

T.6.1 Development of Evaluation framework and evaluation plan

Evaluation framework and evaluation plan

Evaluation framework and evaluation plan

T.6.2 Evaluation and impact assessment

Impact assessments reports

Peer-reviews

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WP7 - Dissemination

Duration: 1.11.2020 – 31.10.2024 | Lead: NERLEI, Austrian coordinator: GTC

T.7.1 Develop Overall Dissemination and Exploitation strategy for the project	Dissemination plan		
T.7.2 Project identity creation	Project identity	CoVE corporate identity	
T.7.3 Homepage, social media and scientific dissemination	Social media channels	GREENOVET Website	
T.7.4 Ongoing Public relation	Press releases	Press events	
T.7.5 Dissemination events	CoVE promotion events	Conference: Excellence in Green Innovation VET	VET attractiveness raising events

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WP8 - Sustainability of CoVEs

Duration: 1.5.2022 – 31.10.2024 | Lead: WKST, Austrian coordinator: WKST

T.8.1 Business and Sustainability Plan	Business and sustainability plan of the CoVE	Regional cooperation agreements
T.8.2 Cooperation with regional stakeholders	Round table: VET skills of the future: Creating jobs and attracting foreign investors	
T.8.3 International cooperation agreement and IPR agreement	International cooperation agreement and IPR agreement	

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WP9 - Project management

Duration: 1.11.2020 – 31.10.2024 | Lead: FHJ, Austrian coordinator: FHJ

T.9.1 Project management, consortium meetings and management board	Project meetings
T.9.2 Internal progress monitoring	Internal progress reports
T.9.3 Interim and final reporting	Interim and final reports

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KnowHub *- Reconnecting universities and enterprises to unleash regional innovation and entrepreneurial activity*

- Good practices of broad collaboration platforms (2/2) -

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Project ID

Programme: Erasmus+ - Capacity Building in the field of Higher Education

Budget: 904.356,00 €

Aim: “Reconnecting universities and enterprises to unleash regional innovation and entrepreneurial activity” ☺

Wider objective

- To develop the PCUs entrepreneurial and innovation capacities and enhance their cooperation with enterprises giving them the central role in the regional innovation ecosystem.

Main expected outcomes

- Increased capacities of PCUs and established cooperation with enterprises
- Improved knowledge exchange and entrepreneurial teaching and learning activities at the 5 PCUs
- Increased awareness and entrepreneurial skills of the staff and students
- Improved practical placement mechanisms at the involved PCUs

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Project consortium

- (P1) FH JOANNEUM
- (P2) WUS Austria
- (P3) University of Girona
- (P4) University of Vaasa
- (P5) National Centre for Development of Innovation and Entrepreneurial Learning (NCDIEL)
- (P6) European University of Tirana
- (P7) University of Vlora
- (P8) University of Sarajevo
- (P9) University of Mostar
- (P10) Technology park INTERA
- (P11) University of Montenegro

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Specific project objectives

Specific objectives

- **To analyse and understand** the knowledge transfer, innovation and entrepreneurial infrastructure and activities at the PCUs in the national ecosystems
- **To set-up and equip 5 Commercialisation Hubs** that will serve as one-stop-shop for cooperation with enterprises and support of students and academic staff in commercialisation
- **To develop capacities** of the Commercialisation Hubs, their services and instruments
- **To increase knowledge transfer** and joint activities between the PCUs and local enterprises through the Commercialisation Hubs
- **To increase students' (self)employability** through practical placement and practice oriented interdisciplinary trainings covering selected EntreComp Framework's competences
- **To train academic staff on entrepreneurial education** to enable and encourage them to include entrepreneurship in their teaching

Work Packages

- **WP1 -** Status-quo analyses
- **WP2** - Setting up 5 Commerciali-sation Hubs
- **WP3** - Capacities building at the 5 Commerciali-sation Hubs
- **WP4** - Setting up portfolio of services and instruments and implementing pilot projects
- **WP5** – EntreEdu Development Programme for PCUs staff and students based on the EntreComp
- **Supporting WPs:**
  - Quality control
  - Dissemination
  - Management

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Influence of EU funded projects on development of higher education

– The case of FH JOANNEUM –

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European projects' structure

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What is EU project?

Definition

"A project is a temporary organisational structure set up to create a unique product or service (output) within certain constraints such as time, cost, and quality."

Source: *European Commission, 2018, p.5*

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Overview of EC funding programmes (2014 – 2020)

1. Aid programme for the Turkish Cypriot community
2. Asylum and Migration Fund
3. Civil Protection and European Emergency Response Centre (ERC)
4. Civil protection mechanism
5. Cohesion fund
6. Common foreign and security policy (CFSP)
7. Competitiveness of enterprises and SMEs (COSME)
8. Connecting Europe Facility
9. Consumer protection
10. Creative Europe
11. Customs, fiscalis, and anti-fraud
12. Erasmus +
13. Environment and climate action (LIFE)
14. Europe for citizens
15. European Agricultural Fund for Rural Development (EAFRD)
16. European Agricultural Guarantee Fund (EAGF)
17. European earth observation programme (Copernicus)
18. European Globalisation Adjustment Fund (EGF)
19. European instrument for democracy and human rights (EIDHR)
20. European Maritime and Fisheries Fund
21. European neighbourhood instrument (ENI)
22. European Regional Development Fund (ERDF)
23. European satellite navigation systems (EGNOS and Galileo)
24. European Social Fund (ESF)
25. European Solidarity Corps
26. European Structural and Investment Funds
27. European Union programme for employment and social innovation
28. European Union Solidarity Fund
29. European voluntary humanitarian aid corps EU aid volunteers (EUAV)
30. Food and feed
31. Fund for European Aid to the Most Deprived (FEAD)
32. Guarantee fund for external actions
33. Health for growth
34. Horizon 2020
35. Humanitarian aid
36. Instrument for emergency support within the Union
37. Instrument for Greenland
38. Instrument for nuclear safety cooperation (INSC)
39. Instrument for pre-accession assistance (IPA II)
40. Instrument for stability (IfS) now called: Instrument contributing to stability and peace (IcSP)
41. Internal Security Fund
42. International thermonuclear experimental reactor (ITER)
43. Interoperability solutions and common frameworks for European public administrations, businesses and citizens (ISA2)
44. Investment plan for Europe
45. IT systems
46. Justice
47. Partnership instrument (PI)
48. Research Fund for Coal and Steel (RFCS)
49. Rights, equality and citizenship
50. Structural Reform Support Programme (SRSP)
51. Territorial cooperation
52. Youth employment initiative

Source: European Commission, n.d.a

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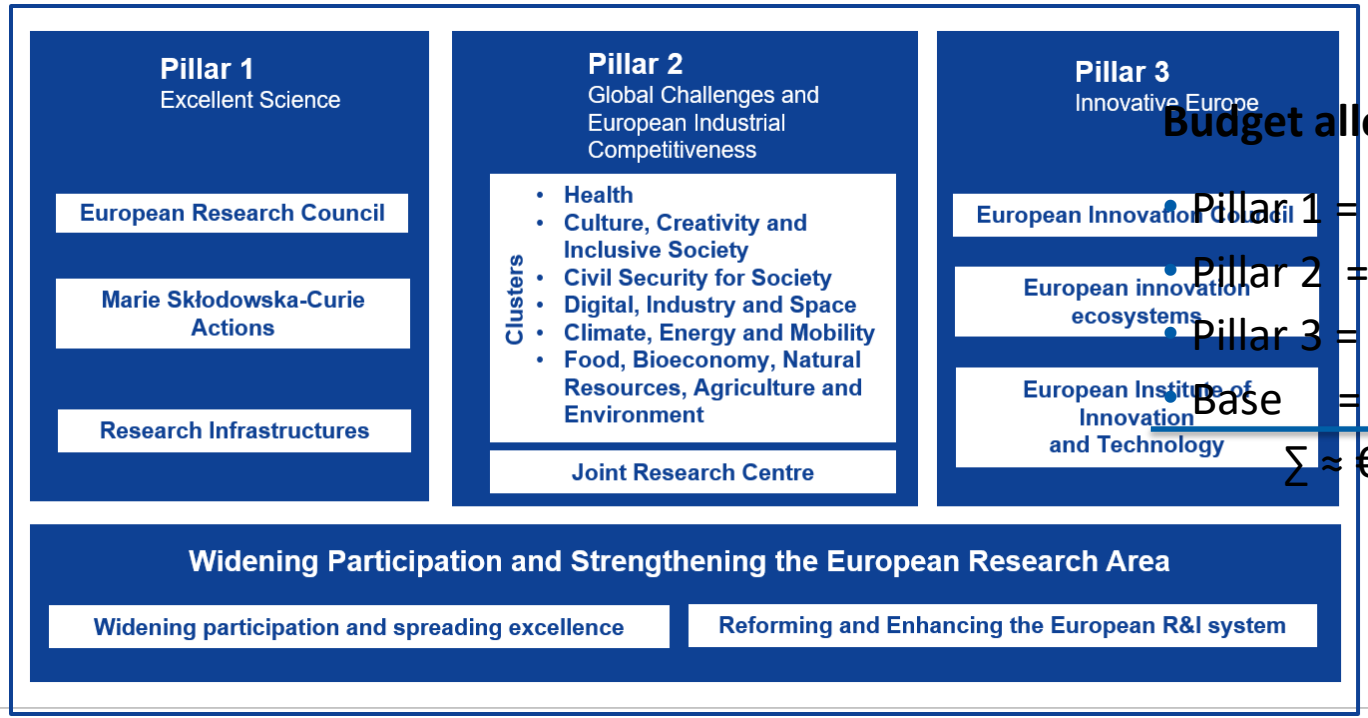
Structure of Horizon Europe (2021 – 27)



Budget allocation

- Pillar 1 = € 25,8 bil.
- Pillar 2 = € 52,6 bil.
- Pillar 3 = € 13,5 bil.
- Base = € 8 bil.

∑ ≈ € 100 bil.

Source: European Commission, n.d.b

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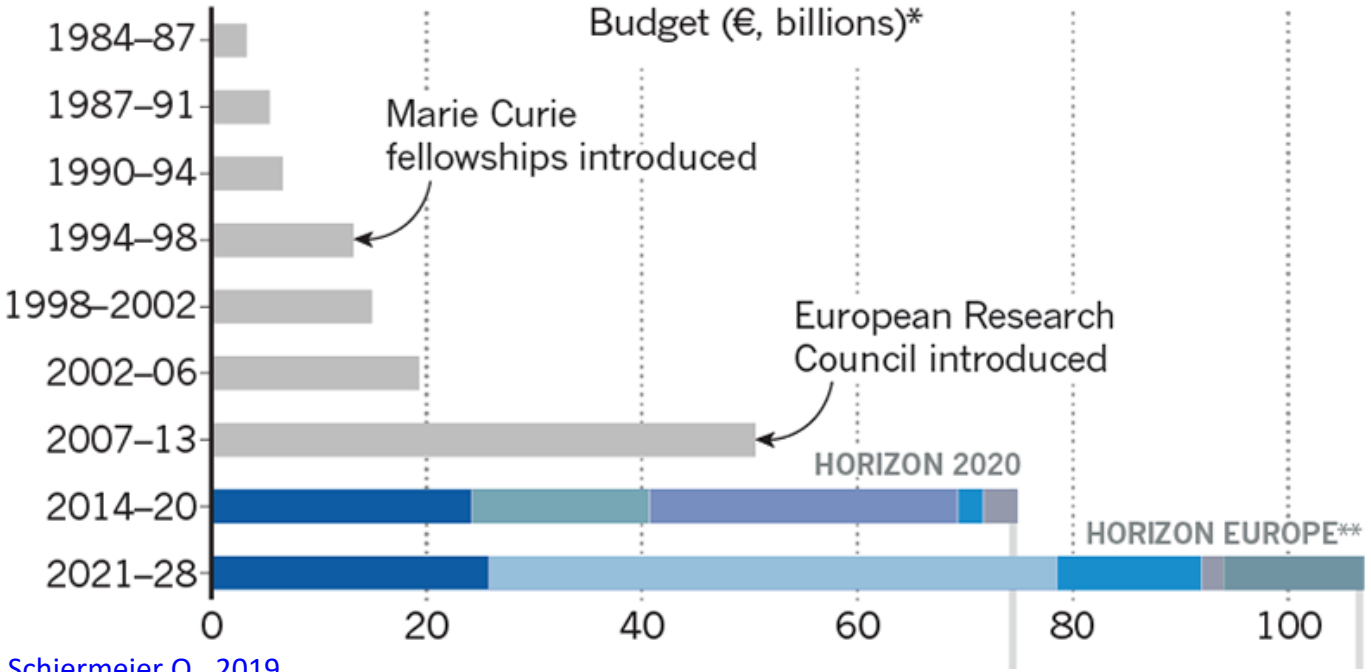
Horizon Europe's History



Source: Abbott A., Schiermeier Q., 2019

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Horizon Europe's strategy

IMPLEMENTATION OBJECTIVES

- Maximising impacts
- Ensuring greater transparency and further simplification
- Fostering synergies with other EU spending programmes
- Easing access through digital transformation and outreach

Source: European Commission, 2020a, pp. 5 - 16

MISSION AREAS

- Adaptation to climate change including societal transformation
- Cancer
- Climate-neutral and smart cities
- Healthy oceans, seas, coastal and inland waters
- Soil health and food

Source: European Commission, n.d.b

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Erasmus+ (2021 – 2027)

Key Action 1 “Learning Mobility”

The mobility of higher education students and staff

Key Action 2 “Cooperation among organisations and institutions”

Partnerships for Cooperation and exchanges of practices
Partnerships for Excellence – European Universities
Partnerships for Excellence – Erasmus Mundus Joint Masters Degrees
Partnerships for Innovation

Key Action 3 “Support to policy development and cooperation”

Networks and policy support measures

Source: European Commission, 2020b, p. 5

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Main challenges

PROJECT FUNDING

- Co-financing
- Flat rate (Lump sums)
- Ceilings
- Proposal development and reporting not funded

PROJECT LIFECYCLE

- Long announcement to implementation lag
- Competitive process

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Benefits for Higher Education Institutions in the European Union

What are the benefits?

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Capacity building

- Knowledge and skills
- Development of concepts

Knowledge and skills

- Peer-learning
- Concept checking
- Co-development

Development of concepts

- Sharing and adapting good practices
- Piloting in different settings and rapid improvement

What are the benefits?

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Internationalisation

- Promotion
- Networking

Capacity building

- Knowledge and skills
- Development of concepts

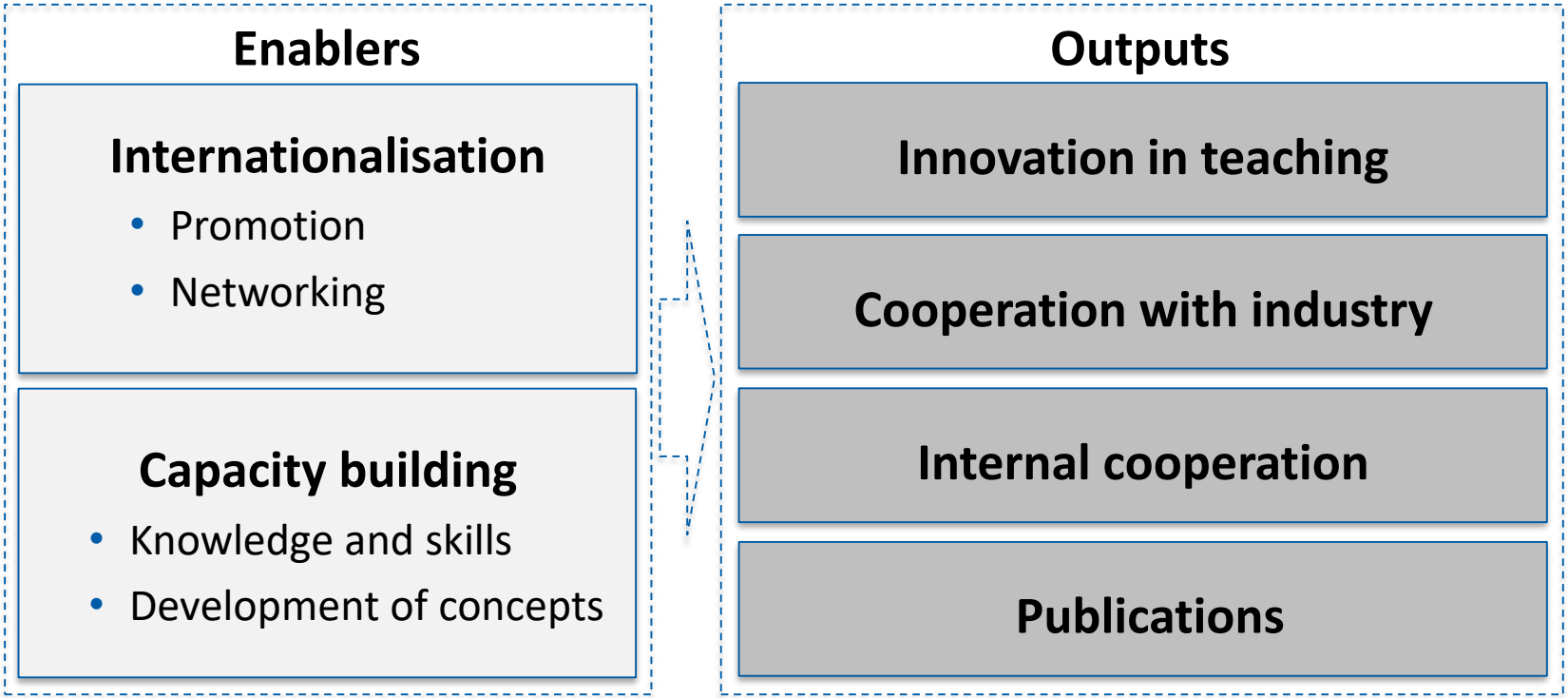
Promotion

- Brand awareness (dissemination events, scientific and press conferences, etc.)
- Long-term connection (mobilities, partnerships, projects)

Networking

- Wide network
- Close cooperation

What are the benefits?



Source: Jovanovski et al., 2019

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Good practices at the Institute of International management, FH JOANNEUM

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Innovation in teaching

REBUS – Ready for Business

E+ Capacity building in Higher Education (2016-19)
Development of online cooperation platform and study visit concept for development of entrepreneurial and cross-cultural skills
Output: 3rd sem. MIG course ECCC together with GBP

CHAIN - Changing SME's by industry 4.0

E+ Strategic partnership in Higher Education (2018-20)
Practical training on managerial and engineering aspects for implementing Industry 4.0 in SMEs
Output: GBP course Business Modelling of Digital Transformation

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Cooperation with industry

SCOPE – Skills for Corporate Entrepreneurship

E+ Strategic Partnerships for vocational education and training
Collaboration between corporations (involving managers and employees) and universities
Good practice catalogue, competence matrix for managers and employees/students, Training programme for managers and employees/students, E-Learning platform, Guide book
Output: Industry project for training and consultancy in servitization

CHAIN - Changing SME's by industry 4.0

Good practices, practical training on managerial and engineering aspects for implementing, and online integrative documentary in five European languages
Output: Cooperation with BDO Austria, Breitenfeld Edelstahl AG and BBG Baugeräte GmbH, resulting with development of cooperation initiatives

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Internal cooperation

CULTURWB – Strengthening Capacities for Tourism Changes in the Western Balkans

Erasmus+ Capacity building in Higher Education
Building Competences for Quality Management of Heritage und Cultural Tourism in the Western Balkans (BIH, MNE, SRB)
Output: Close cooperation between IIB and IGM, contributing to the development of…

TOURIST – Competence Centres for the Development of Sustainable Tourism and Innovative Financial Management Strategies

Erasmus+ Capacity building in Higher Education
Increase the positive impact of local tourism in Thailand and Vietnam
Output: cooperation between IBV, IIB and IGM.

CHAIN - Changing SME's by industry 4.0

Output: Close cooperation between IIB and IWI, resulting with internal guest lectures, joint publications and future cooperation initiatives

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Publications

REBUS – Ready for Business

Jovanovski B., Beinhauer R., Valentic E., Kiendl D., (2019). "Development of successful entrepreneurial education initiatives enabled by EU funded projects - The case of FH JOANNEUM", The Knowledge Society: Diagnosis and Prognosis, DSSH VI/2019, Tirana

Beinhauer R., Jovanovski B., (2019). "A connectivist view on student challenges to teach cross-cultural competences and an entrepreneurial mindset", Cross-Cultural Business Conference 2019, University of Applied Sciences Upper Austria, School of Management, Steyr, May 16th -17th, 2019

CHAIN - Changing SME's by industry 4.0

Jovanovski B., Seykova D., Boshnyaku A., Fischer C., (2019). "The Impact of Industry 4.0 on the Competitiveness of SMEs", Scientific Technical Union of Mechanical Engineering "Industry 4.0" - IV International Scientific Conference Industry 4.0 Summer Session, 24-27 June 2019, Burgas, Bulgaria
+ International Scientific Journal Industry 4.0, Year IV, Issue 5/2019

Jovanovski B. (Editor), Maierhofer C. (Technical editor), co-authors: …Jovanovski B., Fischer C., … Tschandl M.: "Industry 4.0: A Comprehensive Approach - Main Features and Impacts on SMEs", CHAIN project, 2019

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Conclusion

CHALLENGES

- It is demanding to put EU funding projects in line with the standard procedures and workflow in the HEI
- Obtaining mixed project portfolio funded by different EU programmes, non-EU donor funded programmes, as well as industry projects on HEI level

BENEFITS

- When chosen well, EU funded projects' benefits significantly overcome the shortcomings and challenges providing:
  - Innovation in teaching
  - Cooperation with industry
  - Internal cooperation
  - Publications

University Strategy

In a competitive environment of global higher education, universities have to position themselves.

Each university needs a **distinctive profile** in teaching and research.

Partnerships and intensive collaboration may contribute to the competitive advantage of universities.

Hahn, K. 2004: Die Internationalisierung der deutschen Hochschulen. Kontext, Kernprozesse, Konzepte und Strategien, Wiesbaden.

Goals and Priorities: WHY to internationalize

In Teaching:

- Increasing the attractiveness of study programs
- Increasing the employability of students and graduates
- Developing innovative teaching methods

In Research:

- Building research networks
- Enhancing the quality of research

Human Resources:

- Employer Branding of universities – improving the attractiveness as a work place
- Creating opportunities of human resource development

OECD (2012), Approaches to Internationalisation and Their Implications for Strategic Management and Institutional Practice. A Guide for Higher Education Institutions, OECD Publishing.

Instruments of internationalization: HOW to internationalize

a) Partnership Agreements with distinguished universities for:

- Faculty and staff mobility
- Student mobility
- Joint Research activities
- Internship opportunities

b) Membership in university networks

c) Internationalization @ home

- Incoming guest professors and visiting faculty
- Innovative teaching methods, such as virtual classrooms, e-learning, MOOCs and other blended learning formats

Joint or double degree programs: Their purpose and structure

Enabling students to obtain diplomas from two (or more) universities within one study cycle (e.g. within one master programme).

Usually, students spend 1-2 semesters at a partner university as incoming exchange students. They study under special conditions provided in Double Degree Agreements.

Students benefit since they get a diploma from two universities („Joint Degree“) or two diplomas („Double Degree“) from different countries.

OECD (2012), Approaches to Internationalisation and Their Implications for Strategic Management and Institutional Practice. A Guide for Higher Education Institutions, OECD Publishing

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Joint and Double Degree Programs: Definitions I

University of Applied Sciences degree programmes may also be offered as joint/double diploma programmes. Joint/Double diploma programmes are studies which are offered jointly on the basis of agreements between one or several Austrian providers of Universities of Applied Sciences degree programmes and one or several foreign recognised post-secondary educational institutions, with these agreements specifying the […] students' deliverables/performance targets of each of the involved HEI.

(Art. 3 para. 2 subpara. 10, Federal Ministry of Science, Research and Economy: Programmes, Implementation)

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Joint and Double Degree Programs: Definitions II

Joint/Double diploma programmes mean degree programmes which are offered jointly on the basis of agreements between one or several university colleges of teacher education, Austrian universities, maintainers of university of applied sciences degree programmes or private universities and foreign recognized post-secondary educational institutions in the kind of a joint, double or multiple degree program, with these agreements specifying the performance the respective students shall be committed to in the participating institutions.

(Art. 35 subpara. 4, Federal Ministry of Science, Research and Economy: Joint Programmes, Implementation)

Joint and Double Degree Programs: Definitions III

- If a student successfully completes a joint/double diploma programme comprising up to 120 ECTS credits of which at least 30 were obtained under the auspices of a foreign partner institution, or more than 120 ECTS credits of which at least 60 were obtained under the auspices of a foreign partner institution, the award of the degree may be evidenced by a document jointly issued in conjunction with the latter. (Art. 65 para. 5, Federal Ministry of Science, Research and Economy: Joint Programmes, Implementation)
- The completion of a joint programme should lead to the award either of a jointly awarded academic degree or of double/multiple academic degrees that let the holder profit by all legal effects in both countries concerned, above all with regard to access to the relevant professions, without a recognition procedure being required. Therefore, the academic degree shall be anchored in the national legal system of both countries involved.

Double Degree Agreements: Contents

1. **Scope of the DD agreement**
   1. Goal and purpose of the agreement
   2. Participating universities
   3. Duration of the agreement
2. **Student selection and requirements to be fulfilled by the student**
   1. Number of students per university per year
   2. Selection criteria and selection process
   3. Credits and courses to be completed by each student under the DD agreement
3. **Framework conditions**
   1. Legal and financial aspects and procedures (e.g. fees, social security, visa .....)
   2. Quality assurance and accreditation

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Double Degree Agreements: Challenges and Opportunities

Opportunities:

- Mutual learning
- Added value for students and faculty
- Competitive edge for HEI

Challenges:

- Accreditation in two countries according to national standards
- Quality Assurance according to the standards of two separate universities
- Compatibility of academic course offer in the partner institutions

OECD (2012), Approaches to Internationalisation and Their Implications for Strategic Management and Institutional Practice. A Guide for Higher Education Institutions, OECD Publishing

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Double Degree Agreements: Challenges

2007:

„Joint programmes could be subject to accreditation procedures by different accreditation organisations in each of the states where the joint programme is offered. These **distinct** accreditation **jurisdictions** imply the potential involvement of **several** accreditation **organisations** and therefore the execution of **different** accreditation **procedures**."

European Consortium for Accreditation: „Principles for Accreditation Procedures Regarding Joint Programmes", 2007

2012:

- Only 19% of surveyed agencies report to be „effective & successul in carrying out procedures" for QA in transnational programs
- 2 out of 28 agencies „reported relevant practice on validation or assessment of collaborative and/or transnational degree programs"

European Association for Quality Assurance in Higher Education: Quality Procedures in the European Higher Education Area and Beyond – Visions for the Future, Third ENQUA Survey, 2012

Institutional Motivation

Top reasons given by respondents for creating collaborative degree programs

	Rating
Broadening educational offerings	2,24
Strengthening research collaboration	2,21
Advancing internationalization	2,15
Raising international visibility/prestige	2,15
Increasing foreign students enrollment	2,11
Responding to increased competition	1,91
Responding to student demand	1,88
Responding to particular market demand	1,86
Offering courses from partner university	1,85
Increasing revenue	1,61

Source: Joint and Double Degree Programs in the Global Context, IIE & FUB, September 2011

Challenge: Sustainability

Rank	Challenge
1	Ensuring sustainability
2	Securing adequate funding
3	Curriculum design
4	Legal issues
5	Recruiting students
6	Securing support from gov.
7	Accreditation
8	Academic calendar difference
9	Institutional support
10	Credit transfer

Source: Joint andDouble DegreePrograms in theGlobal Context, IIE & FUB, September 2011

Levels of Internationalisation

Model by Minna Söderquist*:

- Level 0: Internationalisation is a random activity. Activities are not coordinated, occur on a singular basis and are not systematically promoted
- Level 1: Creation of an International Office and establishment of student mobility
- Level 2: Internationalisation of curricula (DD) and research activities
- Level 3: Internationalisation becomes an integral part of all relevant organisational and academic areas (R&D, student and teacher mobility...)
- Level 4: Results are used for commercial purposes. Internationalisation is part of the marketing strategy with the aim of acquiring full time students

* The internationalisation and strategic planning of higher-education institutions: an analysis of Finnish EPS strategies. Minna Söderquist. Helsinki: School of Economics and Business Administration, 2001.

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Key Factors for Internationalisation

- Internationalisation is a transversal activity and must comprise all relevant areas of the HEI
- Internationalisation activities must be actively supported by the entire institution and its structures from management to faculties
- Implementation of mobility for all target groups (students, staff, professors)
- „Internationalisation at home“
- An institutional culture that welcomes international guests
- Cooperation with strategic partners
- Research & Development on international level

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"Mobility of staff, students and graduates is one of the core elements of the Bologna Process, creating opportunities for personal growth, developing international cooperation between individuals and institutions, enhancing the quality of higher education and research, and giving substance to the European dimension."

Ministers responsible for Higher Education in the countries participating in the Bologna Process, London Communiqué, May 2007

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Partner Universities

FH JOANNEUM currently has around 400 inter-institutional agreements for mobility and other cooperation activities, such as research.

FH JOANNEUM Graz, Institute of International Management:

Caucasus University, Tbilisi

Tbilisi State Academy of Arts

Karl-Franzens University Graz:

Shota Rustaveli State University

Iwane-Dschawachischwili-Universität Tiflis

Ivane Javakhishvili Tbilisi State University

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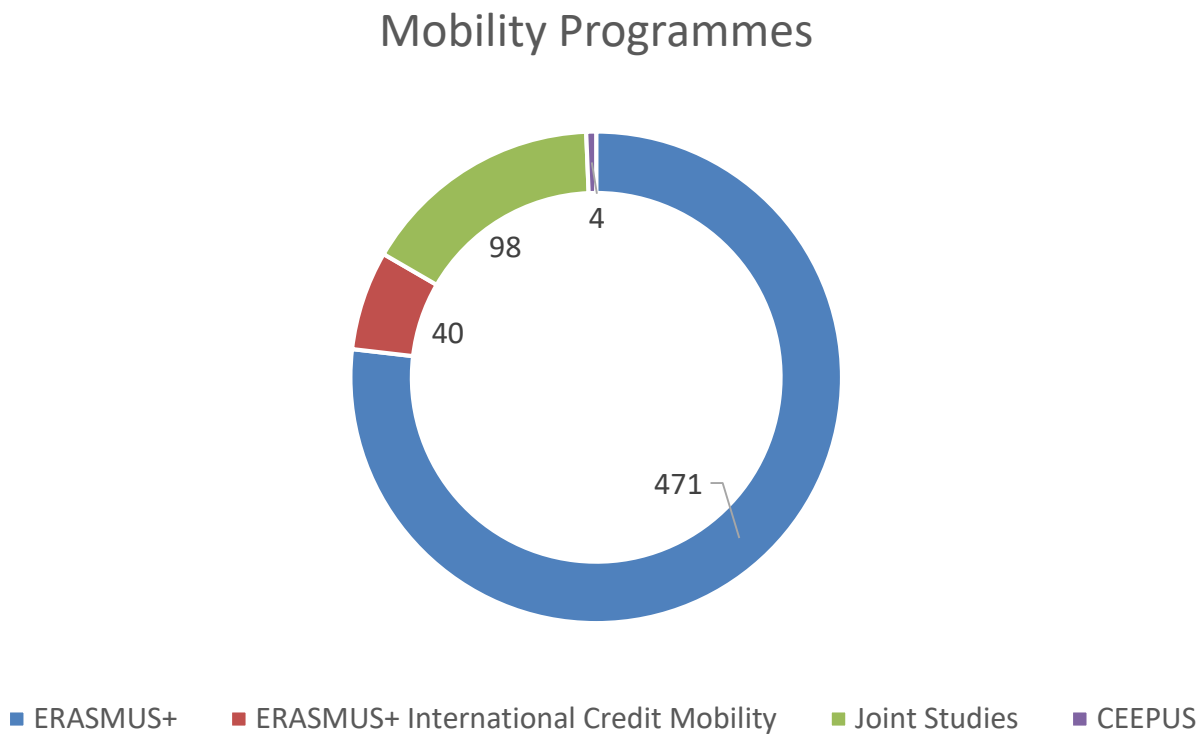

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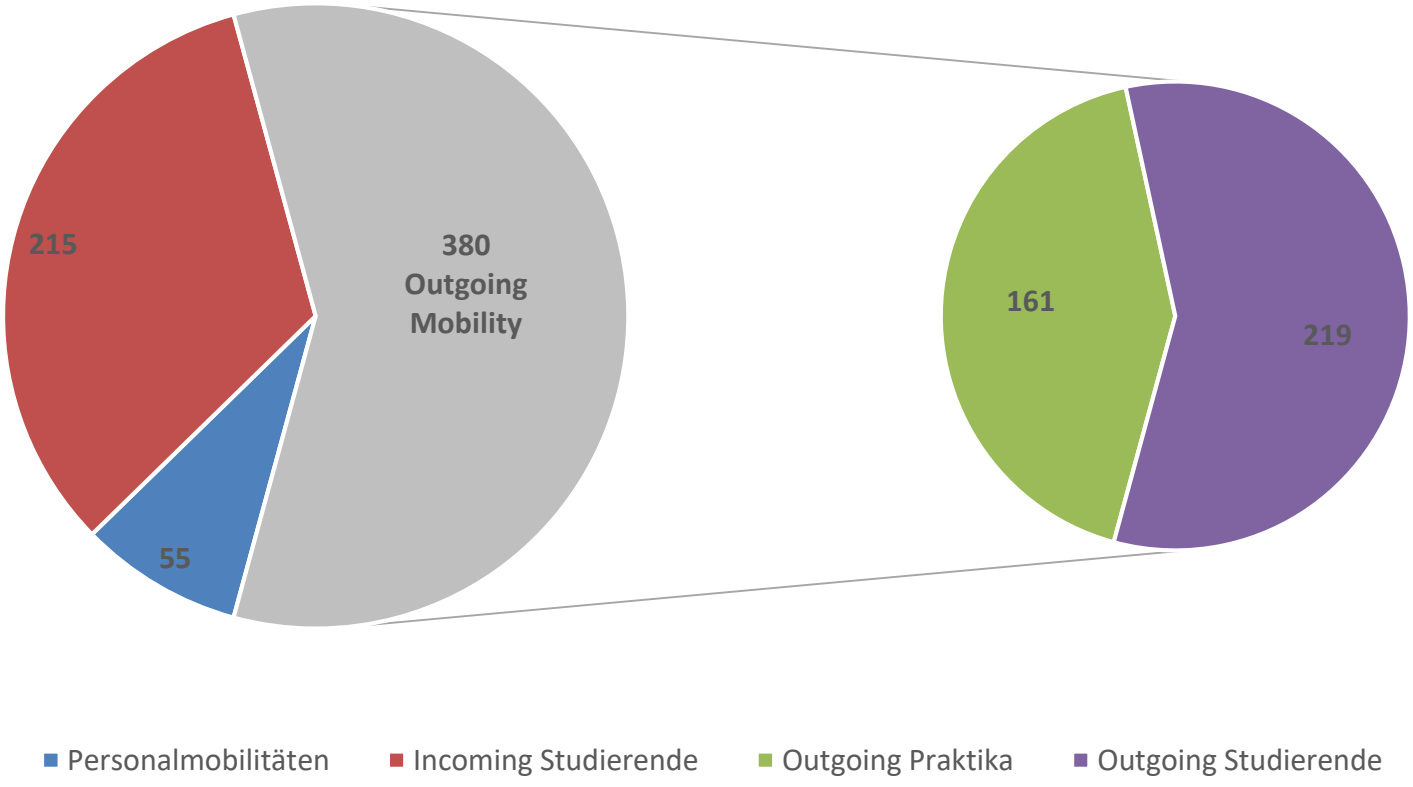

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Programme with Georgia

APPEAR Call
https://oead.at/en/news/article/2021/03/appear-iii-first-call-opened/

APPEAR – How to apply
https://appear.at/en/application/

Search for cooperation partners in AT:
https://oead.at/en/projects/development-research/database/

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Workshop

Strategy

- What is the internationalisation strategy of your university?
- Are you acquainted with internationalisation strategies in your professional area?

Double & Joint Degress

- Do double / joint degrees play a role in your strategy?
- If yes, why?
- If not, why not?

Challenges / Opportunities

- What challenges and opportunities do you face in and out of your university when it comes to internationalisation (e.g. Funding, accreditation, acceptance, awareness...)?

Contents

1 Introduction: Addressing globalization locally

Cities represent the driving force of development in economic, social and cultural life and reflect the spatial organization of human society. Today's global cities have new challenges ahead; they are no longer self-sufficient, but embedded in broader, global developments. Furthermore, the city or strategic urban regions are becoming increasingly important players in the global economy, as the impact of national states decreases while the impact of cities and urban regions is increasing. The process of globalization is reflected in the tendency for gaining competitiveness and efficiencies of global trends.

Spatial and organizational effects of globalization show the concentration of financial and other specialized services in cities, deindustrialization, land use change and the importance of information and communication technologies. The last two hundred years of civilization defines an extensive variety of city visions. Our relationship with the city extends towards the environment, as well as the economy and quality of life. Technology, globalization and the growing complexity of life set cities in the centre of economic development and social progress. Cities are becoming centers of innovation, globalization, urbanization, scientific discoveries and dissemination of information and by the "natural structure" on the other hand also an optimal social unit to implement change and improve people's lives. Although small, because they posses sufficient community cohesion for approval and adoption of new programs, yet large enough to display demonstration effects; they represent messengers of the future in terms of "change cities, change the world".

In a large number of countries, and especially in the EU itself, there is growing interest in the economic contribution cities can make to the GNP. Of course, cities remain enormously diverse. There is not a single model of an urban development and the challenges are not the same in every city. Important differences shape the challenges that cities face: social composition, their economic structure and functions, geographical location and size. Simultaneously, national differences in cultures and traditions, institutional arrangements, economic performance, and government policy have an important impact upon cities, too. The problems of global cities like New York or Berlin or Brussels are far from those in medium-sized cities. Declining large industrial cities with less skilled work force, substantial immigrant communities and exhausted manufacturing economies, face very different dilemmas from fast growing cities based upon high-tech industries. Cities in the periphery face different social, economic and environmental challenges than those in the core.

Nevertheless, despite the differences between them, cities are affected by many common trends and face common challenges. In particular, the key challenge they face is to develop new models of decision-making which will increase their economic competitiveness, but at the same time reduce social exclusion. The size of a city does not matter here. Cities face this dilemma whether they are at the core or periphery, growing or declining economically, large or small. And the challenge confronts decision-makers at all government levels – supra-national, national, regional and local – and in all three sectors – private sector, government and civil society.

Despite the challenges presented by globalisation, institutional change and economic restructuring, many cities have substantial social, economic and cultural assets – and potential. Many of the factors which attract investment, people and events to particular places – education and training, the cultural, residential and physical environment, the quality of labour, the communication and transportation infrastructure, the planning and fiscal regimes, remain under the influence – if not control – of cities. They can be affected by urban strategic management, city policies, although increasingly in particular with other actors. And there are very many examples of successful responses to the new challenges throughout the world.

Many cities have achieved substantial physical regeneration, especially through the renovation of their city centres, which offer impressive retail, cultural, commercial and residential facilities. Many have concentrations of intellectual resources in knowledge hubs – universities as well as research and innovation institutions which encourage high level of innovation. Many cities play important roles as centres of decision-making, communication and exchange. Many have substantial cultural resources, which are increasingly the source of economic growth and job creation. Cities also have enormous integrative potential with the capacity to encourage community participation and civic identity. And many cities remain social and ethnically diverse and offer vibrant cultural opportunities which attract residents (especially creative class) and visitors.

Contemporary society is characterised by what might be described as "extraordinary global change" (Learning City Network, 1998). Globalisation – the "economic and cultural linking of diverse societies across large distances" (UNCHS 2001) – is occurring now with greater scale, scope, speed and level of complexity than ever before. A worldwide mobility of labour, the growth of the knowledge-based economy and information society, and the pervasion of information and communication technologies throughout all aspects of life mean that change is not only extent but ongoing.

Linkages at national and international levels are having significant economic legal, social, technological, cultural and political effects locally and regionally within cities and urban regions. Institutions, organizations and Individuals – indeed, entire communities – need to develop adaptability and resilience if they are to be able to function socially, politically and economically on a continental and/or global stage. Thus "…as the constraints of geographical distance are becoming less important, the specific features of particular locales are becoming *more* important…" and cities are constantly challenged to maintain skills, knowledge and systems that are relevant and competitive. The global phenomenon of the Learning City has evolved in response to this challenge. "A Learning City is any city, town or village which strives to learn how to renew itself in a time of extraordinary global change. Using lifelong learning as an organising principle and social goal, Learning Cities promote collaboration of the civic, private, voluntary and education sectors in the process of achieving agreed upon objectives related to the twin goals of sustainable economic development and social inclusiveness…" (Learning City Network, 1998).

Rapidly changing modern cities are creating a need for strategic development that offers constant a renewal of processes, innovation and peoples' attitudes. It is important that a city's management are able to see processes and events in a new way. An intelligent city has to be able to see what happens through time. An intelligent city needs to analyse, reach conclusions and define its present reality. They need to develop their strengths and eliminate their weaknesses by using out opportunities and reducing threats. That is how we create visions, ideas, and a strategy. This is how we create and prepare for the future. It is essential that a city management has the power to implement all this. Some city managements stay in the analytical phase and never move on to formulating and implementing their visions and dreams.

Strategic intelligence and social analysis involves learning from the past but, most importantly, understands trends and principles of development in the future. Social intelligence is an area of high importance related to city intelligence, being a substantial part of strategic urban management.

City managements leading a city towards an uncertain future are like the captains of a ship. The passengers and crew comprise their customers, employees and citizens. In this way, navigation is very similar to the management of a large organisation or a city.

City governments are highly complex organisations. They need to manage the allocation of resources between different, competing claims and respond to the demands of several different groups at the same time. To make sure that cities reach their development goals they need to be aware of their starting position. City managements need to ask themselves some important strategic questions, identify their strengths and work towards eliminating weakness. Once cities have identified where they are, they need to decide where they want to be in the future. And to reach the destination, they need to understand the significant trends that will influence the direction in which the future unfolds. On that journey, cities need to manage properly their assets by taking a holistic approach. Each asset depends on the others, that's why the holistic approach in urban management is so important. The necessity of taking a holistic emerges particularly strongly from the knowledge-based economy.

These issues have been dealt with in this book through six chapters.

Chapter 2 (Concept of urban competitiveness) starts with a general introduction to the concept of competitiveness. After that, the concept of urban competitiveness is examined in more detail by having a closer look at the determinants that have been identified by modern literature to have a major impact on the development of a city's competitiveness potential. At the close of this part, the author points out some of the major challenges when trying to measure the specific competiveness levels of cities. Improved competitiveness is something that every business, nation, region or city, is trying to achieve. The term is frequently used by politicians, economic experts or commentators on business matters as the ultimate goal for achieving economic prosperity. In reality, competitiveness is a very complex concept that is often poorly understood or misinterpreted, notwithstanding that policy makers are investing remarkable monetary and non-monetary resources in order to improve it.

Chapter 3 (Strategic management of cities) is based on a fact that city governments are highly complex organisations. They need to respond to the demands of many different groups and manage the allocation of resources between different, and often competing, claims. To make sure that cities reach their intended destination they need to be aware of their starting position. This requires them to ask some important strategic questions, identify their strengths and work towards eliminating areas of weakness. Once cities have identified where they are, they need to decide where they want to be in the future. And to do this, they need to understand the significant trends that will influence the direction in which the future unfolds. Managing the six identified capitals (Intellectual and social capital – people and knowledge; Democratic capital – participation and consultation; Cultural capital – values, behaviours and public expressions; Environmental capital – natural resources; Technical capital – man-made capital and infrastructure; and Financial capital – money and assets) effectively means taking a holistic approach, since each of the capitals depends on the others. The necessity of taking a holistic approach is one of the themes to emerge particularly strongly from the knowledge-based economy. Success factors of individual cities differ, however, despite differences, they have a common denominator. All cities have to solve a variety of problems in a variety of environments by identification of five key strategic steps: developing a vision and strategy, building confidence in the city, establishing partnerships, attracting specific factors and implementing key projects. Taking into account the fact that cities are becoming the generator of economic development and a source of growth for the national economy, the need to identify the development stage and the oversight of ranking and positioning of cities and regions (the level of categorization), upon which the preparation of appropriate strategic and development guidelines for cities and urban regions can take place, is emerging.

Chapter 4 (City Partnerships and Networks) starts with the theoretical background regarding the topic of city partnerships is discussed, starting with some general remarks on strategic city management and how city partnerships fit into this concept. Then, the focus is put on the terminology used throughout this paper. Furthermore, the idea of city partnerships is explained in detail including the origins and historical importance of city partnerships and their status quo in Europe and around the globe. A possible classification system for city partnerships is given as well, which is followed by a description of the most important international organizations relevant for cities that are engaged in networking initiatives. Furthermore, key findings in the area of city partnerships are summarized and explained in the end.

Chapter 5 (System of indicators for measuring performance development of cities) is based on recognition that cities are becoming generators of economic development and a source of growth for the national economy. Therefore, there is an increasing urge to identify the stages of development and positioning of cities upon which the adequate preparation of strategic and development guidelines is dependent. Comparison upon the level of their development efficiency calls for indicators, which measure the performance of cities, are representative and comparable between countries. Considering this necessity, at the present many different urban indicators and institutions, seeking compilation and analysis of collected data, can be quoted. Performance measurement systems, developed for internal use in some cities already show a degree of measurement feasibility. The fundamental problem represents their inconsistency and incomparability (over time and between cities), their use therefore cannot be approved in a wider context (benchmark) of situations. Theoretical background and set of indicators, composed by international institutions are usually related to the context of the global cities' comparison, in national framework identified by a large number of people; understandable, expected and reasonable. In the case of medium-sized cities we consequently have to question the applicability of the methodology and indicators used mostly in cases of large, global cities by internationally recognized institutions. With the established set of qualitative indicators and assistance of computer program for multi-parameter decision-making processes this chapter also seeks to compare the performance development of selected European cities.

Chapter 6 (Foreign direct investment and cities) presents the main characteristics of foreign direct investments. Chapter starts with a general description of international capital flows and continues with the presentation of effects of foreign direct investments. International investments bring a lot of different effects to the host economy, which depend mostly on the form of international capital flows and on readiness of the host country to openness. Within positive effects of foreign direct investments the most frequent are the increase of employment, technology and knowledge transfer, better use of infrastructure and local services and additional tax revenue. On the other side, several studies present also risks of foreign direct investments such as crowding-out of domestic companies, adverse competition and pressure on current accounts. Host economies therefore have to attract investments with positive effects which will be easily realized if conditions for investments are favourable. A lot of successful cities have their own tools and strategies for attracting foreign direct investments and maximizing their benefits. In this chapter such strategy is presented.

Chapter 7 (Innovations for sustainability) starts with a general introduction to the term "sustainability", a phrase which could be found in every political text, in every single project and in every text book for students, dealing with development of companies, cities and states. Through her own definition the author stresses out the importance of understanding the concept of sustainability and the responsible use of the term. The similar problem is manifested by using the term "innovations" without truly understand what they actually are and how shall we managed them. Speaking of urban development by not knowing the significance of innovations cannot and will not lead to progress. Through innovation types, in theory mostly created for companies, the solution for municipalities and public organizations is shown. Choosing the right type of innovation and the most suitable way of financing them community's development projects almost cannot fail. The chapter is concluded with urgent analogy between big urban centers and smaller towns and municipalities.

2 Concept of urban competitiveness

"In today's globalized, networked world, every place has to compete with every other place for its share of the world's consumers, tourists, businesses, investment, capital, respect and attention. Cities, the economic and cultural powerhouses of nations, are increasingly the focus of this international competition for funds, talent and fame." (Anholt, as cited in Branding Your City, 2006)

Recommended additional reading:

- Florida, R. 2005. *Cities and the Creative Class*. Oxford: Routledge.
- Glaeser, E.L. (2000). The New Economics of Urban and Regional Growth. In G. Clark, M. Gertler, & M. Feldman, *The Oxford Handbook of Economic Geography* (pp. 83–98). Oxford: Oxford University Press.
- van Winden, W. (2005). *Small and medium-sized cities in the knowledge-based economy: challenges and policy options.* Retrieved from Euricur – European Institute for Comparative Urban Research: http://www.euricur.nl/content_assets/Microsoft%20Word%20-%20LezingMagdeburg.pdf

2.1 Chapter Overview

This chapter starts with a general introduction to the concept of competitiveness. After that, the concept of urban competitiveness is examined in more detail by having a closer look at the determinants that have been identified by modern literature to have a major impact on the development of a city's competitiveness potential. At the close of this part, the author points out some of the major challenges when trying to measure the specific competiveness levels of cities. Improved competitiveness is something that every business, nation, region or city, is trying to achieve. The term is frequently used by politicians, economic experts or commentators on business matters as the ultimate goal for achieving economic prosperity. In reality, competitiveness is a very complex concept that is often poorly understood or misinterpreted; notwithstanding that policy makers are investing remarkable monetary and non-monetary resources in order to improve it.

Learning outcomes

By the end of this chapter successful students will be able to:

1. Explain the concept of urban competitiveness;
2. Describe determinants of urban competitiveness;
3. Understand urban assets.

2.2 Introduction

In the course of the emerging competitiveness hype during the last decade, leading economists debated fiercely whether the term 'competitiveness' can be an attribute of nations, regions and cities, or not. The well-known economist Krugman (1996) states that it makes little sense to apply the concept of competitiveness to territorial units since countries, and by extension regions and cities, cannot go out of business. In contrast to that, very unsuccessful firms are able to do so, which is why the term 'competiveness' can, if at all, only be applied to companies.

Nevertheless, many other authors disagree with Krugman and those who share his views. For example, Camagni (2002) responds to Krugman's statement that places certainly can suffer from the equivalent since stagnant investment, falling per capita incomes or rising unemployment rates can severely damage their competitive position. In addition, Buck and Gordon (2005, p. 1) point out that over time cities always went through cyclical periods of ebb and flow, and that some faded or even vanished from the face of the earth. Moreover, according to Collins (2007) cities compete with each other since all of them strive for enhanced economic development provided by the attraction of, for example, well-educated human resources or private investments.

Furthermore, Kresl claims that cities are competing when trying to become the host city of Olympic Games. London successfully competed with cities like New York, Madrid, Paris and Moscow, and was selected by the Olympic Committee for staging the Olympic Summer games in 2012. What is more, the same author highlights that Chicago, Dallas and Denver all hoped to become the city of choice for the new headquarter of the aircraft manufacturer Boeing. Chicago won this competition, and the other cities lost the opportunity to decrease unemployment rates (Kresl, 2007, p. 13). Finally, nowadays Frankfurt, London, New York, Paris and Tokyo are all battling for being the number one in terms of the provision of leading business services (Begg, 2004, p. 3).

To sum up, it could be concluded that in a perfect market system, in which instant information adjustment prevail, competitiveness among nations, regions or cities cannot exist. However, since such perfect economic conditions do not exist, and since cities benefit from different sets of existing assets and abundant resources, there is little doubt that, despite Krugman's arguments, there is clearly something taking place between cities that can be called 'competition' (Begg, 1999). According to Kresl (2007, p. 13) in order to win these internal city competitions, each city must actively fight to strengthen its competiveness, meaning its ability to compete with comparable other cities.

Improved competitiveness is something that every business, nation, region or city, is trying to achieve. The term is frequently used by politicians, economic experts or commentators on business matters as the ultimate goal for achieving economic prosperity (Turok, 2005, p. 25). In reality, competitiveness is a very complex concept that is often poorly understood or misinterpreted, notwithstanding that policy makers are investing remarkable monetary and non-monetary resources in order to improve it (Begg, 2004, p. 1). Even though the term seems to be familiar to everyone, there is very little agreement neither on how to define competitiveness exactly nor on what strategic policies should be applied to improve it (Porter, 1998, p. xii).

2.3 The Concept of Urban Competitiveness

After having determined that cities compete with each other for additional, economic development, the concept of urban competitiveness has to be examined in a more detailed way.

Modern literature highlights that one has to distinguish carefully between the concept of urban competitiveness and the concept of firm-based competitiveness due to the fact that the former is sometimes falsely assessed in the same way as the latter, namely by simply comparing a city's economic growth and related indices with those of other cities. Consequently, a competitive city will sometimes be defined as having relatively high growth domestic product (GDP) numbers and employment figures (Turok, 2005, p. 26).

According to Bailey et al. (2004, p. 137), however, equating urban competitiveness with firm-based competitiveness is not an appropriate measurement approach since such economic indices tend to focus more on historical performance than on future economic potential. Besides, when looking at the definitions of the two concepts, it becomes clear that a specific distinction between those two concepts has to be made. In fact, the concepts differ manifestly in their complexity. For example, a White Paper created by the government of the UK defines competitiveness for a company as being "the ability to produce the right goods and services of the right quality, at the right price, and at the right time. It means meeting customers' needs more efficiently and more effectively than other firms (DTI, 1995, p. 8).

Contrary to that, a definition for urban competitiveness made by the Urban Competitiveness Project characterizes competitiveness as "referring to the degree to which a city, or an urban region, in comparison with other competing cities, is able to provide the jobs, income, cultural recreational amenities, degree of social cohesion, governance and urban environment to which its current and targeted new residents aspire" (Kresl, 2007, p. 17). Additionally, Michael Storper (1997, p. 264) defines urban competitiveness as "the ability of an economy to attract and maintain firms with stable or rising market shares in an activity, while maintaining stable or increasing standards of living for those who participate in it", meaning that the competitiveness of cities is not just about the income of firms but also about how that income goes to residents.

As can be seen from the definitions, the competitiveness concept for a company is rather simple and one-dimensional. Economic indicators, such as the firm's performance expressed in sufficient returns on capital, are the only important factors for measuring the competitiveness of a firm (Bailey et al., 2004, p. 135). A thorough review of modern literature, however, discloses pretty clear that for defining and assessing urban competitiveness it is not enough to focus on economic performance indicators only. According to Gardiner et al. (2004) and Lever (1999) the concept of urban competitiveness is rather complex and multi-faceted, which basically means that it involves more than just comparing cities in terms of a single dimension.

For example, the European Commission (2000 & 2001) determines the following ten characteristics as potentially relevant for a competitive city:

- a highly skilled workforce;
- capabilities for advanced RDI (research, development and innovation);
- good internal connectivity together with strategic transport and IT connections to selling markets and;
- nationally and internationally reputable facilities for events;
- a city centre of distinctiveness;
- sophisticated cultural infrastructure and services;
- a capability for effective governance and delivery of efficient services;

- a reputation for environmental excellence and responsibility;
- a wide spectrum of high quality residential choices;
- an inclusive and diverse society.

In this text, the concept of Michael Storper is followed, whereas the competitive city is being defined as the city, being able to attract and maintain companies with rising or at least stable market shares. At the same time, city itself should maintain increasing or at least stable standards of living for those who participate in it. The competitiveness of cities is not just about the performance of companies, but also how that income arrives to residents.

To the above listed characteristics, some others were added which were suggested by our previous research and literature review to be equally important:

- fiscal incentives available to cities;
- vision, leadership and strategic decision-making capacity;
- scope and quality of national governmental policies, especially their strategic and operative support for development of cities within nation. Also powers and resources (autonomy) which is provided to cities, is very important;
- innovation in companies and organisational behaviour in cities.

Kresl (1994, p. 51) stresses the following dimensions as being determinants for a highly competitive urban economy:

- creation of high-skill, high-income jobs,
- production shifts to environmentally benign goods and services,
- production focuses on goods and services with desirable characteristics, such as a high income elasticity of demand,
- appropriate economic growth achieves full employment without generating negative market aspects,
- a city chooses its own future rather than passively accepting its lot by specializing in particular activities, and
- a city improves its position in the urban hierarchy.

As can be surmised from the lists above, experts' opinions about the characteristics of urban competitiveness differ greatly. Although, the list of Kresl portrays a more accurate notion of urban competitiveness than is brought forth by any approach that is focusing on economic output indicators only, it seems to be fixated on too abstract determinants, which tend to put a competitive city on the same level as an ideal, unattainable economy. After having clarified that the concept of urban competitiveness is a multidimensional one, it is, therefore, crucial to examine more specific determinants, which are proven to have a significant influence on an increase or decrease of cities' competitiveness levels.

2.4 Determinants of Urban Competitiveness

Broadly speaking, modern literature identifies two types of determinants, namely those that are beyond any direct control of individual cities, and those that are within a city's touching distance to a greater or lesser extent. To the former belong macroeconomic factors, as e.g. currency exchange rates and interest rates (Begg, 2004, p. 4). To the latter belong the elements that are illustrated as a pyramidal competitiveness model in Figure 1 below, namely urban input or assets, revealed output and targeted outcomes.

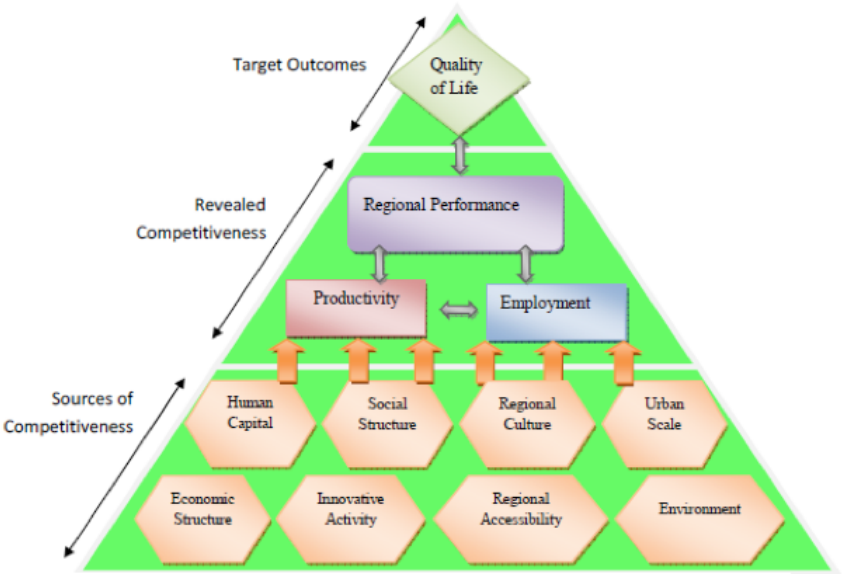

Figure 1: Pyramidal Model of Regional Competitiveness
Source: Adapted from Gardiner et al. 2004

First of all, a city's input or assets stand for their sources of competitiveness from which the city can draw its power to enhance its competitiveness level. Such basic assets can come from manifold foundations or categories, and their proliferation may differ from city to city. Secondly, output refers to easily measureable performance indicators of an urban area that depend on both the productive efficiency of a given workforce as well as the level of employment within a city (Gardiner et al., 2004). However, although such economic measures indicate what can be termed 'revealed competitiveness', Lever (1999) clearly claims that economic output discloses little about the underlying urban assets, meaning that such indices do not reveal why a city is more or less competitive.

Consequently, it would be somewhat negligent to assess the competitiveness of a city in terms of economic performance variables only (Gardiner et al., 2004). Last but not least, the further enhancement of the quality of life and of attractive amenity provisions in a city must be regarded as ultimate goal or targeted outcome for policymakers and, therefore, as having an impact on the competitiveness of a city. Here, it has to be highlighted that the better a city can exploit such elements for the establishment of an attractive environment, the more competitive the city can become in the end. The following sub-chapter intends to examine each group in more detail.

2.5 Urban Assets

As mentioned above, many different urban assets or foundations, which are more or less intertwined with each other, together form a city's power source, which enables a city to enhance its level of competitiveness. To the most important basic foundations belong according to the modern literature, the following categories:

- knowledge base
- urban diversity
- innovativeness and accessibility
- agglomeration and urban scale
- social cohesion, and
- economic heritage.

Knowledge Base

The first category, the so-called knowledge base, according to Lever (2002) involves available sources of tacit and codified knowledge, the overall knowledge infrastructure of a city and the general educational level and creativity potential of the people living in the city. Many studies suggest a positive relationship between a city's knowledge base and its economic development. For example, Matthiessen et al. (2002) conclude that a city's knowledge assets have a considerable impact on the overall economy of the city since such assets are of increasing importance with respect to economic change and growth.

According to van den Berg et al. (2007), however, cities often neglect to exploit their knowledge assets in a full way since they are unable to optimize the interaction between universities and business entities. In addition, it is recommended to address the problem of knowledge fragmentation within research institutions as well. In fact, larger cities are typically hindered to perform in an efficient way due to the fact that their various sources of knowledge, e.g. their universities, are acting independently from each other, and therefore often generate knowledge duplications. As a consequence, city governments would do well to align the different sectors of research, education and business in a better way. Additionally, several studies (e.g. Gleaser, Sheinkman and Sheifer, 1995) have identified the positive correlation between relative high amounts of university graduates working in a city and an overall improved economic performance of the city.

Regarding the creativity potential of people, Florida (2005) highlights the economic importance of creative people, the so-called creative class, who hold the information needed to produce all kinds of knowledge-intensive *art*, like software programs, songs, poems or designs. Black and Henderson (1997) and Simon and Nardinelli (1996) approve of the accumulation of well-educated people and the consequential spillovers of tacit knowledge which promote the long-term growth of cities. In order to enhance its competitiveness level a city must, therefore, apply every effort to attract such well-educated knowledge workers (Gleaser et al., 1995 as well as Kimbrough & Murphy, 2005). According to Kresl (2007, p. 14) a city in the twentyfirst century must attract skilled workers, who are scarce, rather than unskilled workers, who are abundant throughout the world.

As mentioned before, Florida (2000, p. 6) believes that instead of simply choosing the job with the highest salary potential, talented people are normally more concerned with place-based characteristics. In addition, van den Berg et al. (2005) argue that knowledge workers are allured by places, where they can enjoy life. Besides, creativity tends to attract other creative knowledge workers, which means that there is a cumulative effect involved (Florida, 2000, p. 15).

Moreover, Glaeser (2000) believes that companies are searching for locations, where they have access to a well-educated labor force rather than access to customers or suppliers, and that they are even willing to follow movements of well-educated knowledge workers to other, more enjoyable cities.

To sum up, the latest research on regional development highlights the importance of shifting the policy focus on people rather than on firms. As a matter of fact, the assets of cities are regarded as unique sources for attracting highly skilled and talented people, who in turn can leverage the competitiveness levels by strengthening the knowledgeintensive economy (Lee, Florida, and Acs, 2004 as well as Turok, 2005, p. 41).

Urban Diversity

Urban diversity is a city's openness or tolerance towards outsiders. According to Florida (2002, p. 249 ff) and Begg et al. (2004, p. 103) diversity among people living in a city fosters interactions between residents, and, therefore, leads to newly generated knowledge and innovations. In addition, creative knowledge workers are more likely attracted to cities that are associated with a high level of diversity since the social hurdles to enter such a city are relatively low. Again, many internationally recognized studies found the positive correlation between urban diversity and economic growth to be true (e.g. Glaeser et al., 1995).

Urban diversity can be best measured in terms of the number of people, who are born with different national roots. Another indicator is presented by Florida (2002, p. 333), who measures this foundation on the basis of the relative share of homosexual couples living in an urban area. It has to be highlighted, however, that cultural diversity might bring along some social drawbacks as well. According to van den Berg et al. (2007) there are many districts within European cities where badly integrated immigrants live, who cannot contribute to the overall economic development of these cities since they do not possess well-developed, knowledge-intensive skills.

Innovativeness and Accessibility

As van den Berg et al. (2007) observe, the competitiveness of a city is becoming increasingly reliant on innovation and entrepreneurship. However, it is proven by empirical evidence that regions across the globe unevenly benefit from innovative activities. As a matter of fact, high concentrations of innovation and entrepreneurship can be usually found in agglomerated, urban areas only. For example, Cooke and Simmie (2005, p. 98) state that 67% of all patent exports in Italy are undertaken around Milan and Turin. Furthermore, they argue that 60% of Japanese R&D laboratories in the US are located just around four urban areas, namely Boston, New York, Chicago and Los Angeles/San Francisco. Besides, innovation does not have to be necessarily about breakthroughs in new technologies (Hospers, 2003).

Due to the fact that knowledge is the main factor that fosters the development of an innovative environment, one can come to the conclusion that in order to enhance the overall innovativeness, cities have to ensure that firms are fed with the best sources of knowledge (Cooke & Simmie, 2005, p. 110). Additionally, according to Simmie (2005) face-to-face contacts at infrastructural hubs foster knowledge spillovers that lead to innovation. Consequently, a high level of national and international accessibility facilitated by international airports, high-speed train connections and a well-functioning, local transportation network might be crucial for a city to sustain social and economic development (Parkinson et al., 2004, pp. 58f.). Furthermore, local innovation is promoted variously in different states. For example, while innovation is primarily driven by the private market with only little outside coordination in the UK, in Germany multi-level networks are implemented in order to stimulate innovative thinking between private and public organizations (Parkinson et al., 2004, p. 60).

Agglomeration and Urban Scale

A noticeable determinant of urban competitiveness is the geographic concentration of economic activities or, in other words, the tendency for companies to cluster around urban areas, which implies that firms benefit from being located near cities (Turok, 2005, p. 35). According to Gordon and McCann (2000), geographical proximity enhances companies' economic opportunities, such as benefiting from economies of scale and scope, and softens the risks to which they are potentially exposed. More than a hundred years ago, Marshall (1890) was already highlighting the mutual gains of different companies, which were geographically clustered. What is more, literature assesses the size of a city as an important determinant for its success. The bigger a city is in size, the more attractive it tends to be for both knowledge workers and companies.

Social Cohesion

Another fundamental foundation for cities' assets deals with the levels of social equality and poverty in an urban area. As shown before, nations, regions and cities strike different paths in order to sustain further economic growth. For instance, Finland bases its development plan on social equality while the US banks on its *American dream* philosophy, where differences in social classes function as primary motivator (Le Galès, 2007). Generally speaking, however, low levels of poverty and social inequality are favorable both from a societal perspective and from an economic one. As a matter of fact, high levels of societal exclusion and poverty may cause tensions between the upper and lower social classes. Such tensions may result in higher criminal activities or even civil wars, lower safety perceptions of inhabitants and tourists and generally a significantly decreasing quality of life (Hall and Pfeiffer, 2000, p. 21). What is more, low levels of social cohesion may imply that valuable human capital is excluded from economic life, and therefore wasted (van den Berg et al., 2007).

Economic Heritage

The economic history of a city must also be seen as a factor that influences its competitiveness in times of the knowledge economy. As indicated before, many cities in more developed economies went through a rapid expansion in the 19th century as an economic consequence of the industrial revolution. Such cities grew tremendously because of the development of particular industries, e.g. the steel industry or the coal industry, and their economic advantage of having access or being relatively close to important, industrial raw materials (Begg et al., 2004, p. 101). However, over time the economic environment has changed, and what used to be an advantage in the past turned out to be a disadvantage in the modern economy. Indeed, changes in advanced economies have devaluated cities' geographical advantages of the past (van den Berg et al., 2005, p. 10). Traditional smoke-stack industries near cities were replaced by smaller, customized factories (Gleaser, 1998). Knowledge intensive activities displaced the production of tangible goods.

In general, literature assumes that cities which were dominated by traditional manufacturing industries and port activities tend to suffer from a less well-educated labor force, inappropriate levels of air pollution, a tarnished city image and lower standards of living (van den Berg et al., 2005, p. 10). As a consequence, these days such cities struggle to overcome their manufacturing legacies and their outdated social, economic and institutional structures, which hinder them to leverage their competitiveness levels, while others profit from the enhancement of more modern service industries and find themselves on a steady, economic rise (Begg et al., 2004, p. 101ff). A study of the largest US cities revealed that while about one quarter managed to transform a population decline into a growth between the 1980s and 1990s, and another quarter experienced constant growth, about a half of the screened cities faced severely damaging losses (Beauregard, 2004).

Economic Outputs

As mentioned before, modern literature claims that some researchers are misled to equate productivity levels or per capita income figures with the relative competitiveness of cities (Bailey et al., 2004, p. 136). Nevertheless, economic performance output plays an essential role. According to Turok (2005, p. 26), approaches, which are intended to gain insights into the competitiveness level of a city, need to consider, among other things, the city's ability to sell products and services in competitive, external markets and its efficiency to produce products and services.

Variables that are often used for assessing the economic output of a city are, among others, its GDP per capita, change in GDP per capita, GDP per employed resident, the rate of unemployment and the number of newly formed companies (Bailey et al., 2004, p. 136ff). GDP per capita, which is frequently utilized by the DTI to evaluate regions' competitiveness levels (e.g. DTI, 2000), measures the capacity of a city's resident to generate economic wealth. In general, the major advantage of indicators determining GDP figures is that they are related to residents' income levels and consequently their living standards in a positive way. Major drawbacks of GDP per capita are, however, that this indicator reacts very slow to change and highlights historic data only (Bailey et al., 2004, p. 137). Besides, a city's economic productivity might be best evaluated by utilizing its figures for GDP per employed resident. In addition, from the level of unemployment one can infer a city's labor utilization and how equal income is distributed among residents. Indeed, the higher the unemployment rate, the smaller the numbers of residents that benefit directly from newly generated income (Bailey et al., 2004, p. 137). Last but not least, the number of newly founded companies is frequently believed to be positive related to a city's competitiveness level since it ought to be obvious that newly set up firms bring along innovation and entrepreneurial spirit (Bailey et al., 2004, p. 147). However, the rate of newly established firms is only valuable when taking the number of companies' failures into consideration at the same time.

Quality of Life and Urban Amenities

As indicated before, in order to gain from additional economic development opportunities, modern literature identifies a city's quality of life as indicator of utmost importance due to the fact that a high quality usually tends to attract well-educated people and, consequently, investments of companies. In addition, Florida (2000, 2003, 2005) identifies in his comprehensive studies about the creative class cultural and recreational amenities as significant drivers for the competitiveness of a city. Attributes, which are associated with a high quality of life and a diverse, urban amenity offering in a beneficial way, are, among others, high-quality housing, recreation facilities, a public health care system, an attractive built environment, nice and clean city parks, lack of pollution, low crime levels, lifestyle opportunities, international schools, attractive natural surroundings, commercial space and political involvement (Rogerson, 1999 as well as van Winden, 2005).

2.6 Conclusion

Nowadays, city leaders of important cities in Europe, such as Barcelona or Amsterdam, argue, however, that the economic vitality of major cities shall never be marked down as unimportant for the overall economic well-being of their countries (Kresl, 2007, p. 14). In addition, along with political interest, literature on urban significance is growing rapidly, (Gardiner et al., 2004) and there is extensive evidence that cities are increasingly recognized as places to live and areas of potential opportunities rather than places of liabilities (The World Bank, 2000, pp. 1f. As well as Parkinson et al., 2004, p. 52). Consequently, policymakers are supposed to shift their focus from a national strategic level to a sub-national, urban one.

Also, European cities are extremely diverse with respect to their economic structure, their social composition, their physical size and their geographical location (Parkinson et al., 2004, p. 13). Indeed, following Begg, Moore and Altunbas (2004, p. 102) each city has a distinguishing urban identity, which may provide both opportunities as well as threats concerning their individual economic development. As a result, European cities stand at different starting points, face diverse challenges and strategic policies to leverage urban competitiveness (Bailey, Docherty, & Turok, 2004, p. 156). As a matter of fact, London may suffer from different problems than Vienna, and what works well in Munich might not be successful in Helsinki at all. According to Kresl (2007, p 18) this will be reinforced by the fact that societal preferences with respect to economic prosperity differ among nations.

However, despite their differences cities are influenced by macroeconomic commonalities, as well. For example, due to collapsing trade hurdles, falling transport costs, rising exports, imports and foreign investments, arising transnational corporations, and the triumphal advent of new information and communication technologies (ICTs), in short, an increasingly globalized environment, the world's economies are more than ever connected with each other (Turok, 2005, pp. 26f.).

Hence, traditional patterns of trade and production in modern economies have changed in a radical way (Hospers, 2003). Indeed, trade in intangible services is about to challenge trade in tangible goods. In addition, multinational companies try to exploit the concept of international division of labor by shifting their manufacturing facilities to countries, where poor working conditions, low health and safety regulations and, therefore, low costs of human resources, prevail (Lever W.F., 2004, p. 11). Also, this trend does not stop at manufacturing companies. Enterprises engaged in service activities, e.g. tourism companies, software developers or call centers, make usage of lower wages in less developed countries as well (Howland, 1996).

As a consequence of that, globalization, being today's major economic driver, forces all kinds of economic players, including nations, regions and, especially, cities, in more developed countries to reconsider their competitive advantages, strengths and opportunities in order to sustain their present levels of welfare (Hospers, 2003). Typically, the transition towards the knowledge economy is believed to be modern economies' greatest opportunity in the 21st century (van Winden, 2005). Indeed, the vast majority of modern literature on regional development concludes that nations, regions and cities need to rearrange their knowledge assets in order to exploit market opportunities, satisfy customers, enhance society's general environment and compete successfully within the global race for economic development (DTI, 1998, p. 6).

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3 Strategic management of cities

Most of us fear change. Even when our minds say change is normal, our stomachs quiver at the prospect. But for strategists and managers today, there is no choice but to change. (Robert Waterman Jr.)

Recommended additional reading:

- Kresl, P.K. (2007). *Planning cities for the future: urban economic strategies in Europe.* Cheltenham, UK: Edward Elgar Publishing Limited.
- PricewaterhouseCoopers (PWC). (2005). *Cities of the Future: global competition, local leadership.* Retrieved from PricewaterhouseCoopers-Website: http://www.pwc.com/en_GX/gx/government-public-sector-research/pdf/cities-final.pdf

3.1 Chapter Overview

As pointed out in previous chapters, globalization and the economic consequences involved, dramatically changed the environment for cities. This was also true for urban planning strategies that aimed to enhance the economy of a city. Although cities' authorities did much planning prior to the beginnings of globalization and the increased competition between urban areas as well, such planning efforts must be regarded as being rather ordinary and inefficient since they tended to target objects, such as social housing projects or land use projects, which had only marginal impacts on the enhancement of a city's competitiveness (van den Berg et al., 2005, p. 12). In other words, such planning strategies were not components of long-term strategic visions, and therefore did not address a city's specific economic development needs in an effective way.

However, as the world has become more and more global, many city leaders started to realize that it is time to take over new responsibilities, including a long-term oriented, pro-active urban policy development thinking approach. Due to the rapidly changing global environment, the leaders of cities recognized that it is crucial for a city to be prepared for the future. As a consequence, today modern city management approaches comprise a thorough analysis and understanding of the present situation of the city in order to enhance current strengths and eliminate current weaknesses, the identification of future trends which might have an impact on the city and the development of a vision and a promising, long-term strategy in order to exploit future opportunities and tackle potential threats to the city.

In view of the competitive environment cities have to face today, managing a city becomes comparable to managing a large organization. Cities, which want to influence their future development actively, have to be aware of their strategic assets and resources, have to have a vision and have to develop a strategy to reach their long-term goals. City networks, co-operations and partnerships are among many others part of a city's strategic assets and resources and can be therefore used to accomplish a city's vision and to support its strategy (PwC, 2005, pp. 14–16). This discipline of managing a city according to economic concepts is called strategic city management and is introduced to the reader throughout this chapter. First of all, the basic idea of strategic city management is explained. This is followed by a more detailed description of a city's strategic assets and the most common visions and strategic goals, which cities set for themselves.

Learning outcomes

By the end of this chapter successful students will be able to:

1. Understand managing different types of capital in a city
2. Understand and describe main principles when managing people, property and processes in a city
3. Understand the practical concept of urban management.

3.2 Introduction

Globalisation and decentralisation have forced regions and cities to face numerous problems and challenges. Some have managed to solve the problems and became the 'cities of the future', others have failed to do so and are called the 'cities of the past'. To improve the position of the latter, good use of city capital must be ensured to achieve competitive advantages. These competitive advantages today are based on knowledge and information technology.

"Internationalization, change into a society where information and creativity are of importance, and rising weight of network position alter the risk pattern and thereby create new demands for active urban policy of marketing and strategic planning…Only localities that actively fight for their future will have one" (Anderson, Wichmann and Matthiessen, 1995).

According to PwC (2005), managing a city is comparable to managing a large organization. In order to be prepared for the future, cities and companies need to know where they are today (their present situation) and what is necessary to achieve their future goals (vision and strategy). Besides, they have to be aware of the external environment and trends, which might affect their decisions and which might also be drivers for change. Future trends such as globalization, urbanization, migration, changing demographics and others can be both, a threat and an opportunity for cities. However, if the city administration is able to develop its city's strengths and eliminate its weaknesses, the city is on the best way to reach its goals (PwC, 2005, pp. 14–16).

3.3 Different types of capital and assets in a city

There are six different types of capital (PWC 2005) that need to be managed strategically:

- Intellectual and social capital – people and knowledge;
- Democratic capital – participation and consultation;
- Cultural capital – values, behaviours and public expressions;
- Environmental capital – natural resources;
- Technical capital – man-made capital and infrastructure;
- Financial capital – money and assets.

Capital	**Examples**
Intellectual and Social Capital	People and resources of knowledge
Democratic Capital	Transparency, partnerships and participation
Cultural and Leisure Capital	Values, public expressions and behaviors
Environmental Capital	Natural resources
Technical Capital	Infrastructure, man-made capital
Financial Capital	Assets and money

Table 1: Examples for different types of capital

As mentioned above, many different urban assets or foundations, which are more or less intertwined with each other, together form a city's power source, which enables a city to enhance its level of competitiveness. To the most important basic foundations belong according to the modern literature, the following categories:

a) knowledge base,
b) urban diversity,
c) innovativeness and accessibility,
d) agglomeration and urban scale,
e) social cohesion, and
f) economic heritage.

Knowledge Base

The first category, the so-called knowledge base, according to Lever (2002) involves available sources of tacit and codified knowledge, the overall knowledge infrastructure of a city and the general educational level and creativity potential of the people living in the city. Many studies suggest a positive relationship between a city's knowledge base and its economic development. For example, Matthiessen et al. (2002) conclude that a city's knowledge assets have a considerable impact on the overall economy of the city since such assets are of increasing importance with respect to economic change and growth. According to van den Berg et al. (2007), however, cities often neglect to exploit their knowledge assets in a full way since they are unable to optimize the interaction between universities and business entities. In addition, it is recommended to address the problem of knowledge fragmentation within research institutions as well. In fact, larger cities are typically hindered to perform in an efficient way due to the fact that their various sources of knowledge, e.g. their universities, are acting independently from each other, and therefore often generate knowledge duplications.

As a consequence, city governments would do well to align the different sectors of research, education and business in a better way. Additionally, several studies (e.g. Gleaser, Sheinkman & Sheifer, 1995) have identified the positive correlation between relative high amounts of university graduates working in a city and an overall improved economic performance of the city. Regarding the creativity potential of people, Florida (2005) highlights the economic importance of creative people, the so-called creative class, who hold the information needed to produce all kinds of knowledge-intensive *art*, like software programs, songs, poems or designs. Black and Henderson (1997) and Simon and Nardinelli (1996) approve of the accumulation of well-educated people and the consequential spillovers of tacit knowledge which promote the long-term growth of cities.

In order to enhance its competitiveness level a city must, therefore, apply every effort to attract such well-educated knowledge workers (Gleaser et al., 1995 as well as Kimbrough & Murphy, 2005). According to Kresl (2007, p. 14) a city in the twentyfirst century must attract skilled workers, who are scarce, rather than unskilled workers, who are abundant throughout the world. As mentioned before, Florida (2000, p. 6) believes that instead of simply choosing the job with the highest salary potential, talented people are normally more concerned with place-based characteristics. In addition, van den Berg et al. (2005) argue that knowledge workers are allured by places, where they can enjoy life. Besides, creativity tends to attract other creative knowledge workers, which means that there is a cumulative effect involved (Florida, 2000, p. 15).

Moreover, Glaeser (2000) believes that companies are searching for locations, where they have access to a well-educated labor force rather than access to customers or suppliers, and that they are even willing to follow movements of well-educated knowledge workers to other, more enjoyable cities.

To sum up, the latest research on regional development highlights the importance of shifting the policy focus on people rather than on firms. As a matter of fact, the assets of cities are regarded as unique sources for attracting highly skilled and talented people, who in turn can leverage the competitiveness levels by strengthening the knowledge intensive economy (Lee, Florida, & Acs, 2004 as well as Turok, 2005, p. 41).

Urban Diversity

Urban diversity is a city's openness or tolerance towards outsiders. According to Florida (2002, p. 249ff) and Begg et al. (2004, p. 103) diversity among people living in a city fosters interactions between residents, and, therefore, leads to newly generated knowledge and innovations. In addition, creative knowledge workers are more likely attracted to cities that are associated with a high level of diversity since the social hurdles to enter such a city are relatively low. Again, many internationally recognized studies found the positive correlation between urban diversity and economic growth to be true (e.g. Glaeser et al., 1995).

Urban diversity can be best measured in terms of the number of people, who are born with different national roots. Another indicator is presented by Florida (2002, p. 333), who measures this foundation on the basis of the relative share of homosexual couples living in an urban area. It has to be highlighted, however, that cultural diversity might bring along some social drawbacks as well. According to van den Berg et al. (2007) there are many districts within European cities where badly integrated immigrants live, who cannot contribute to the overall economic development of these cities since they do not possess well-developed, knowledge-intensive skills.

Innovativeness and Accessibility

As van den Berg et al. (2007) observe, the competitiveness of a city is becoming increasingly reliant on innovation and entrepreneurship. However, it is proven by empirical evidence that regions across the globe unevenly benefit from innovative activities. As a matter of fact, high concentrations of innovation and entrepreneurship can be usually found in agglomerated, urban areas only. For example, Cooke and Simmie (2005, p. 98) state that 67% of all patent exports in Italy are undertaken around Milan and Turin. Furthermore, they argue that 60% of Japanese R&D laboratories in the US are located just around four urban areas, namely Boston, New York, Chicago and Los Angeles/San Francisco. Besides, innovation does not have to be necessarily about breakthroughs in new technologies. (Hospers, 2003) Indeed, five different kinds of innovation can be identified: a) process innovation, b) product innovation c) input or raw material innovation, d) new markets, and e) new organizational forms (Schumpeter, 1942, pp. 132f.).

Due to the fact that knowledge is the main factor that fosters the development of an innovative environment, one can come to the conclusion that in order to enhance the overall innovativeness, cities have to ensure that firms are fed with the best sources of knowledge (Cooke & Simmie, 2005, p. 110). Additionally, according to Simmie (2002) face-to-face contacts at infrastructural hubs foster knowledge spillovers that lead to innovation. Consequently, a high level of national and international accessibility facilitated by international airports, high-speed train connections and a well-functioning, local transportation network might be crucial for a city to sustain social and economic development (Parkinson et al., 2004, pp. 58f.). Furthermore, local innovation is promoted variously in different states. For example, while innovation is primarily driven by the private market with only little outside coordination in the UK, in Germany multi-level networks are implemented in order to stimulate innovative thinking between private and public organizations (Parkinson et al., 2004, p. 60).

Agglomeration and Urban Scale

A noticeable determinant of urban competitiveness is the geographic concentration of economic activities or, in other words, the tendency for companies to cluster around urban areas, which implies that firms benefit from being located near cities (Turok, 2005, p. 35). According to Gordon and McCann (2000), geographical proximity enhances companies' economic opportunities, such as benefiting from economies of scale and scope, and softens the risks to which they are potentially exposed. More than a hundred years ago, Marshall (1890) was already highlighting the mutual gains of different companies, which were geographically clustered. What is more, literature assesses the size of a city as an important determinant for its success. The bigger a city is in size, the more attractive it tends to be for both knowledge workers and companies.

In times of the knowledge economy three major economic benefits regarding geographic concentration of companies and the size of cities can be identified (Collins, 2007). Firstly, companies benefit from clustering around larger cities due to the possibility to recruit from a larger pool of specialized human resources and a better access to supplying and supporting components, such as marketing services, communication facilities or venture capital. Moreover, knowledge workers are more likely to move to larger cities since metropolitan areas offer a greater variety of jobs (Turok, 2005, p. 35). Equally, suppliers and distributors gain from being located close to a larger city due to the increasing chance to get in contact with potential buyers (European Cities Monitor, 2009). Secondly, all parties involved gain from greater knowledge spillovers and information flows. As indicated before, the frequent exchange of tacit knowledge stands in direct relationship with economic success. Due to the compact clusters of companies, face-to-face exchange of technological information and knowledge that leads to innovation is more likely to happen (Malmberg et al., 1996). Thirdly, larger sized urban areas usually harbor a broader set of amenities that are, as explained before, so crucial to attract knowledge workers and firms. A large urban size provides, among others, international schools and universities, various cultural institutions, an enlarged transportation network and numerous, entertaining alternatives (van den Berg, 2007).

Social Cohesion

Another fundamental foundation for cities' assets deals with the levels of social equality and poverty in an urban area. As shown before, nations, regions and cities strike different paths in order to sustain further economic growth. For instance, Finland bases its development plan on social equality while the US banks on its *American dream* philosophy, where differences in social classes function as primary motivator (Le Galès, 2007). Generally speaking, however, low levels of poverty and social inequality are favourable both from a societal perspective and from an economic one. As a matter of fact, high levels of societal exclusion and poverty may cause tensions between the upper and lower social classes. Such tensions may result in higher criminal activities or even civil wars, lower safety perceptions of inhabitants and tourists and generally a significantly decreasing quality of life (Hall & Pfeiffer, 2000, p. 21). What is more, low levels of social cohesion may imply that valuable human capital is excluded from economic life, and therefore wasted (van den Berg et al., 2007).

Economic Heritage

The economic history of a city must also be seen as a factor that influences its competitiveness in times of the knowledge economy. As indicated before, many cities in more developed economies went through a rapid expansion in the 19th century as an economic consequence of the industrial revolution. Such cities grew tremendously because of the development of particular industries, e.g. the steel industry or the coal industry, and their economic advantage of having access or being relatively close to important, industrial raw materials (Begg et al., 2004, p. 101). However, over time the economic environment has changed, and what used to be an advantage in the past turned out to be a disadvantage in the modern economy. Indeed, changes in advanced economies have devaluated cities' geographical advantages of the past (van den Berg et al., 2005, p. 10). Traditional smoke-stack industries near cities were replaced by smaller, customized factories (Gleaser, 1998). Knowledge intensive activities displaced the production of tangible goods.

In general, literature assumes that cities which were dominated by traditional manufacturing industries and port activities tend to suffer from a less well-educated labour force, inappropriate levels of air pollution, a tarnished city image and lower standards of living (van den Berg et al., 2005, p. 10). As a consequence, these days such cities struggle to overcome their manufacturing legacies and their outdated social, economic and institutional structures, which hinder them to leverage their competitiveness levels, while others profit from the enhancement of more modern service industries and find themselves on a steady, economic rise (Begg et al., 2004, p. 101ff). A study of the largest US cities revealed that while about one quarter managed to transform a population decline into a growth between the 1980s and 1990s, and another quarter experienced constant growth, about a half of the screened cities faced severely damaging losses (Beauregard, 2004).

3.4 Economic outputs

As mentioned before, modern literature claims that some researchers are misled to equate productivity levels or per capita income figures with the relative competitiveness of cities (Bailey et al., 2004, p. 136). Nevertheless, economic performance output plays an essential role. According to Turok (2005, p. 26), approaches, which are intended to gain insights into the competitiveness level of a city, need to consider, among other things, the city's ability to sell products and services in competitive, external markets and its efficiency to produce products and services.

Variables that are often used for assessing the economic output of a city are, among others, its GDP per capita, change in GDP per capita, GDP per employed resident, the rate of unemployment and the number of newly formed companies (Bailey et al., 2004, p. 136ff). GDP per capita, which is frequently utilized by the DTI to evaluate regions' competitiveness levels (e.g. DTI, 2000), measures the capacity of a city's resident to generate economic wealth. In general, the major advantage of indicators determining GDP figures is that they are related to residents' income levels and consequently their living standards in a positive way.

Major drawbacks of GDP per capita are, however, that this indicator reacts very slow to change and highlights historic data only (Bailey et al., 2004, p. 137). Besides, a city's economic productivity might be best evaluated by utilizing its figures for GDP per employed resident. In addition, from the level of unemployment one can infer a city's labor utilization and how equal income is distributed among residents. Indeed, the higher the unemployment rate, the smaller the numbers of residents that benefit directly from newly generated income (Bailey et al., 2004, p. 137). Last but not least, the number of newly founded companies is frequently believed to be positive related to a city's competitiveness level since it ought to be obvious that newly set up firms bring along innovation and entrepreneurial spirit (Bailey et al., 2004, p. 147). However, the rate of newly established firms is only valuable when taking the number of companies' failures into consideration at the same time.

3.5 The 'Five Pillar' approach

This modern approach of managing a city can also be referred to as 'strategic economic planning' (SEP). As indicated above, SEP is different from ordinary strategic urban planning since it focuses on the efficient utilization of its assets in order to accomplish an objective which enjoys great support for the city's residents and which is supposed to leverage the city's competitiveness level. (Kresl, 2007, pp. 2ff.) According to Kresl (2007, pp. 29ff) an effective SEP effort consists of at least five components. These components are:

- an objective examination of the urban region's strengths and weaknesses in relation to other urban competitors,
- involvement of the public and of all major entities in the region in an exercise that will make clear the actual aspirations and concerns of the local residents and entities,
- a design of a strategic economic plan and vision that realizes the previously identified realistic aspirations and concerns,
- a mobilization of local human resources on the context of clear responsibilities and lines of authority and with an understanding of who or which agency is in charge of the process, and
- regular monitoring and evaluation efforts of progress and performance.

Additionally, it is important to emphasize an appropriate marketing and communication of these future-oriented strategic components and the goals involved, since in times of increased urban competition, a city will not be able to stand out from competition, and therefore not be able to leverage its attractiveness for new businesses and highly educated knowledge workers (PWC, 2005).

After identifying a city's strategic assets and resources, every city should develop a vision statement, its long-term strategic goals and a proper strategy. Although those strategic items are set up individually by every municipality, many cities focus on the same general issues. Having a look on the development goals of cities around the globe, it can be noticed that nearly every city today aims at being a place to live, work, educate, socialize and relax. Through a modern image and a warm atmosphere, people and companies shall be invited to come, to stay and to spend their money in the cities (PwC 2005, p. 8). PwC who analysed vision statements and strategic goals of cities around the globe, has come to the conclusion that for nearly every modern city in the 21st century, three different concepts, describing the ideal or competitive city of the future, seem to bear resemblance to the city's individual vision and strategy. All of those three concepts, which are called the *knowledge city*, the *creative city* and the *intelligent city*, combine the aforementioned aims.

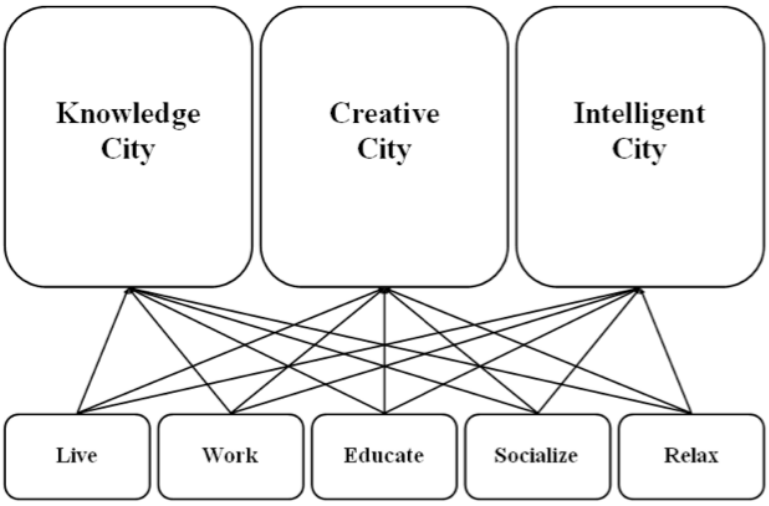

Figure 2: The Three Concepts for an Ideal City
Adapted from PwC, 2005, pp. 8; 20–22

Explaining those concepts shortly, the knowledge city is a city with high quality and density of educational and research facilities and highly knowledge-based economy. The creative city on the other side refers to a diverse and highly experienced group of citizens, who want to have action, experiences in various fields, a dynamic environment and a place for self-realization. Finally, an intelligent city is not only a combination of the aforementioned concepts, but a place for knowledge exchange and generation between citizens and/or people from other cities, and a city which is constantly developing and adapting to future needs (PwC, 2005, pp. 20–22).

By the way, those five cornerstones of a successful city, namely being a place to live, to work, to educate, to socialize and to relax, cannot only be used to develop the ideal city in theory on the one hand but also to compare cities with each other on the other hand. A good example for comparing cities according to those dimensions is the European Smart Cities ranking. This ranking is aimed at finding Europe's smartest medium-sized city according to the following dimensions:

- smart governance,
- smart economy,
- smart living,
- smart mobility,
- smart people and
- smart environment.

By using such city rankings, researchers, economists and politicians are able to draw conclusions whether one city can be seen to be better in one area than others (European Smart Cities Ranking, 2011).

Developing the Vision and Strategy (VIS) model for strategic management of a city

Strategic development plan is a basis for achieving optimal results through management process. It should be directed towards various goals, but above all towards economic growth and employment (by enhancement of entrepreneurship and innovative activities, use of ICT, modernisation of education) leading towards increased welfare while securing sustainable development.

Methodological approach should be based on definition and evaluation of key indicators of the national and regional development strategy, leading towards developing such a strategy with a focus on economic development, social, public health, cultural, environmental, and ecological policies. In this phase it is essential to achieve the highest possible consensus about the fundamental strategic development policy amongst all stakeholders in the city.

Based on statistical analysis, strategic goals and key indicators are aggregated in five clusters/areas (indicated in Figure 5). Simultaneously, five aggregated key indicators for monitoring purposes should be designed.

On the operational level, the following activities are needed (the entire approach is depicted in Figure 4):

- Analysis of the basic operational strategic programmes
- Establishment of the 'Monitoring Committee' which role will be to monitor and evaluate the development of the Strategic Operational Plan' as well as the Management of Changes Strategy.
- Design of semi-structured survey, organising interviews, focus group meetings reflect back workshops and telephone interviews with stakeholders.

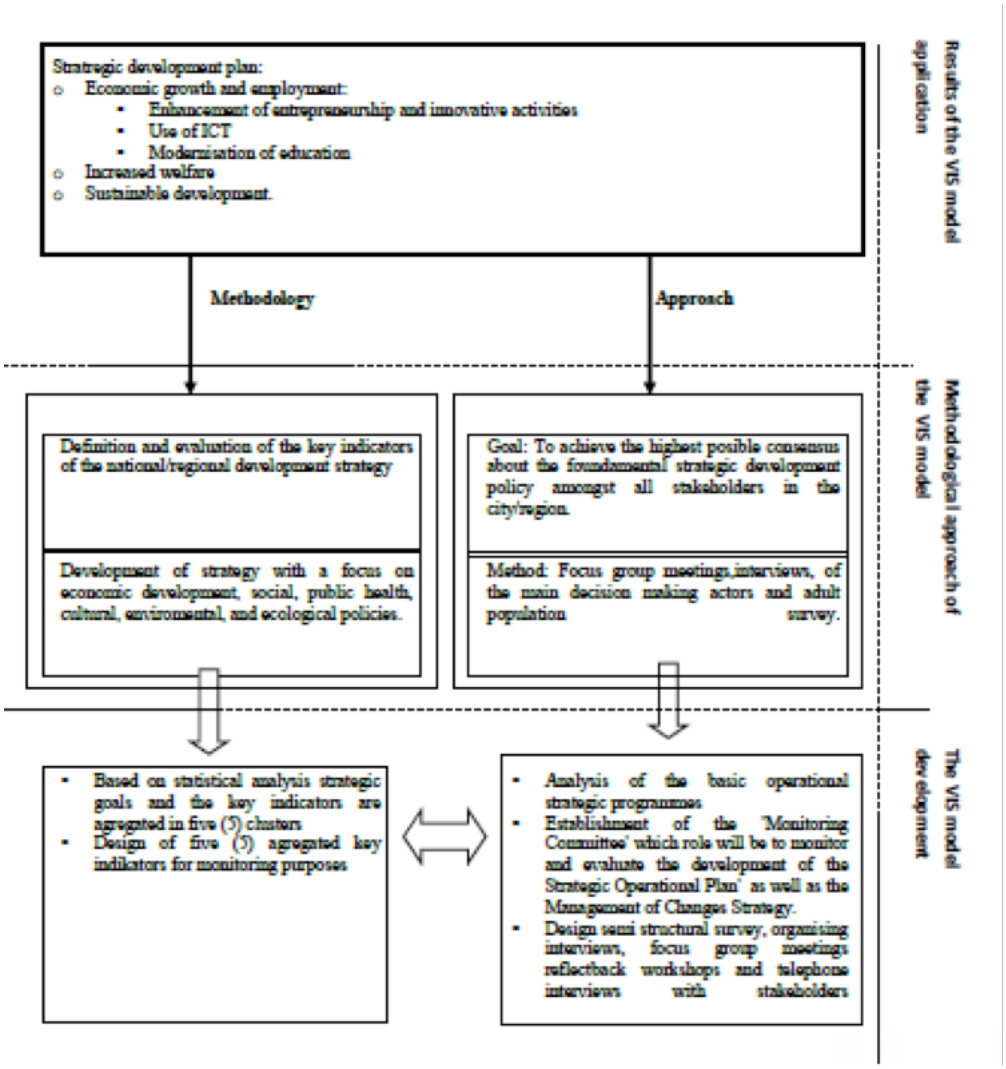

Figure 3: Process of developing the VIS model

With defining and assessing the five pillars/clusters/areas (economy, transportation and communication, education, environment, quality of life) in a 'Vision and strategy' (VIS) model, particular attention is paid to balanced approach as an example of what can be done in each of the five areas.

The VIS model for city management is developed through analysis of strategic development documents, design of framework for vision and strategy model, defining five pillar model for strategic planning, defining consistent system of economic indicators and semi-structured in-depth interviews with city representatives and experts on urban competitiveness. The framework of VIS model is shown in Figure 5 below.

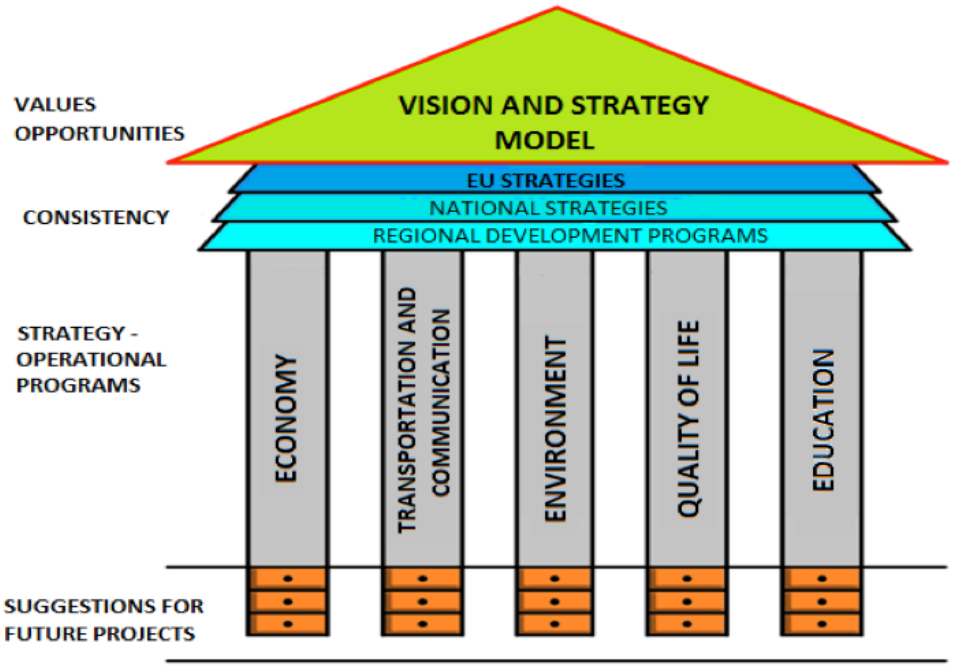

Figure 4: The Vision and Strategy Model (VIS)

The model enables cities to improve their position with respect to higher productivity, educated labour force, high economic growth, added value per capita and ultimately, to increase quality of welfare.

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4 City partnerships and networks

A radically different order of society based on open access, decentralized creativity, collaborative intelligence, and cheap and easy sharing is ascendant. (David Bollier)

Recommended additional reading:

- Abrahamsen, R. (2004). The power of partnerships in global governance. *Third World Quarterly,* 25(8), 1453–1467. Retrieved from EBSCO Host database.
- Habitat International (2009). Transnational city-to-city co-operation: Issues arising from theory and practice (Editorial). *Habitat International*, 33, 131–133. Retrieved from Science Direct database.
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4.1 Chapter Overview

Having a look at current literature regarding city partnerships, it can be observed that lots of cities are linked to another city through partnership agreements (Villiers et al., 2007, p. 1). This chapter intends to give an overview of the concept of city partnerships and of its real importance for urban areas around the globe. Firstly, the terminology regarding city partnerships is introduced. Then, the origins and historical importance of city partnerships are explained and the status quo and trends relevant for this networking form are introduced. This is followed by a possible classification of city partnerships and a short description of important international organizations relevant for partner cities. Last but not least, existing literature on the topic is analyzed and key findings regarding city partnerships are summarized.

Learning outcomes

By the end of this chapter successful students will be able to:

1. Use appropriate terminology
2. Understand the origins and historical importance of city partnerships
3. Recognize trends of city partnerships
4. Identify current literature on city partnerships.

4.2 Introduction

As the competitive environment within the EU becomes more and more intense, it is a major goal of many regions to keep their positions as high quality living and cultural areas, well-known industrial locations and popular centers of education and know-how. This competitiveness among different regions in Europe is especially problematic for cities or urban areas, as they are considered to be the key success factors within this competition. Searching for ways how to improve their so-called urban or regional competitiveness, many government officials have realized that their existing city partnerships might have – among others – the potential to support the achievement of their city's goals.

Having a look at city networking around the globe, it can be observed that nearly every city has closed some kind of international linkage today. Those links are usually made in the form of city partnerships, which are – expressed in simplified terms – an agreement between two or more parties (i.e. city councils or other urban administrations) that have agreed to work together for mutual benefit. However, in most cases, such city partnerships are seen as a mean of expressing friendship and furthering cultural exchange only, whereas their potential to contribute to a city's overall strategy is often neglected.

This chapter starts with a general introduction to strategic city management and city networking. In the beginning, the three most important forms of networking, namely networks, co-operations and partnerships are distinguished from each other. Afterwards, the focus is put on the third networking form, the partnerships solely. The origins and historical importance of city-to-city (C2C) partnerships are explained as they give valuable insights for understanding today's C2C linkages. This is followed by a description of the status quo and trends of city partnerships, which can be expected within the next years. Focus is put on the global dimension of C2C partnerships on the one hand and on insights into C2C links in Europe and between European countries on the other hand. Further sub-chapters hereafter deal with important international organizations, which are relevant for C2C networking partners, and a possible classification of C2C links in more detail. This classification is based on the dimensions geographical scope, co-operation structure, active participants, external support and objectives of C2C links nowadays. To conclude this chapter, existing literature about the topic is analyzed and key findings of other cities engaged in C2C co-operations are introduced.

4.3 Terminology

There is no generally accepted definition of city networking and its different forms in current literature. The variety of terms, which are used for this concept, is not simplifying the matter either (Habitat International, 2009, p. 131 as well as Villiers et al., 2007, p. 1). This sub-chapter tries to give an idea of what city networking is and how the different forms of networking can be distinguished from each other. Starting with some remarks on which types of networking can be observed nowadays and what characterizes them, the chapter will later on focus on one specific form of city networking, namely city partnerships, in particular. As the concept of city partnerships is of more relevance for strategic city management, two definitions provided by the United Nations Development Programme (UNDP) and the Council of European Municipalities and Regions (CEMR) will be introduced to the reader in detail.

Generally speaking, every formal agreement between two or more parties (i.e. cities or other urban administrations) that have agreed to work together in the pursuit of common goals can be assigned to the area of city networking. As it is with the parties to decide upon the scope of objectives, duration, membership and alteration of their networking agreement, it is of no wonder that city networking occurs in many different ways (UNDP, 2010), (Devers-Kanoglu, 2009, p. 202), (Hoetjes, 2009, p. 160). In current literature, the concept of cities engaged in networking is called city partnerships, city-to-city (C2C) networks, C2C co-operation, twinning, friendship link, sister cities, municipal partnerships, international co-operation, decentralized co-operation etc., which already demonstrates the wide variety of networking forms. In many cases and in many academic papers, these expressions refer to the same kind of relationship between cities and are used simultaneously without any respect to their difference in meaning. However, in the strict sense, those terms may refer to different kinds of city networking in terms of amount of involvement, commitment, objectives, duration and others. Ewijk and Baud (2009) give a good overview how to distinguish different networking forms from each other. In their opinion, the expression *city networking* is seen as an umbrella term, whereas the terms *networks, co-operations* and *partnerships* are different categories of city networking. This relationship between city networking, networks, co-operations and partnerships is illustrated in Figure 5.

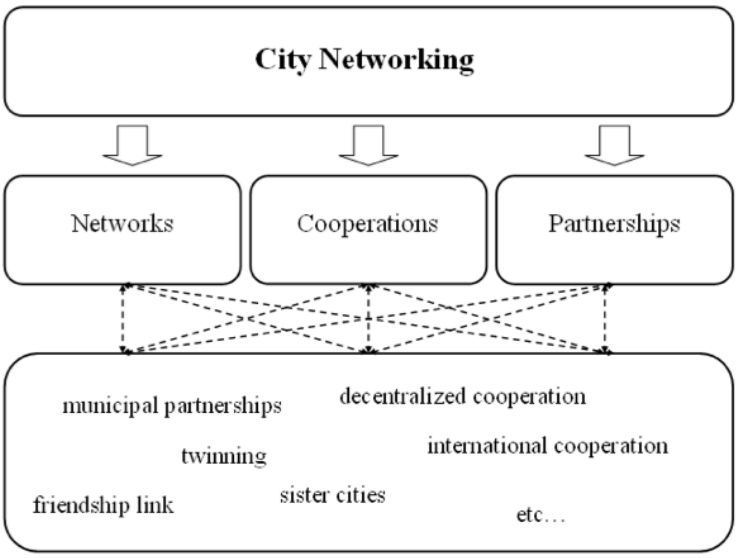

Figure 5: The Three Types of City Networking
Adapted from Ewijk and Baud, 2009, p. 220

As it can be seen above, city networking can be distinguished into three different forms, namely networks, co-operations and partnerships. Those three types of city networking have many synonyms on their part, which cannot be assigned to one of the three categories of city networking exactly. The difference between networks, co-operations and partnerships according to Ewijk/Baud (2009) are further explained throughout the following paragraphs.

Networks

Besides C2C co-operations and partnerships, networks are one of the three different forms of city networking. According to Ewijk and Baud (2009), networks or C2C networks, are defined as a relatively loose form of international co-operation with horizontal information exchange, without hierarchy and without long-term commitments. Thus, they can be seen as the simplest form of international co-operation. Being engaged in C2C networks, cities or urban administrations usually benefit from information exchange within the network primarily. Furthermore, networks, which usually have a thematic and/or geographical focus, are oftentimes characterized by members, who contribute a lot to the overall goals, whereas other members only take but do not give. Examples for C2C networks are CITYNET or The Mega-Cities Project (Ewijk and Baud, 2009, p. 220), (Keiner and Kim, 2007, pp. 1370–1393). CITYNET, which is the Regional Network of Local Authorities for the Management of Human Settlements for Asian-Pacific countries, is a network which brings together local authorities in order to support them in effectively managing their urban development processes by exchanging expertise and experience among the members (CITYNET, 2010), (Hosaka, 1993, pp. 136–137), (Tjandradewi and Marcotullio, 2009, pp. 166–167). The Mega-City Project is a network of mega cities and organizations within those cities, which are trying to solve problems faced by such cities in the areas poverty, environment and participation ('Mega-Cities Project', 2010).

Co-operations

Co-operations are seen as an organized interaction for a common end and mutual benefit. The expressions C2C co-operations, international co-operation and decentralized co-operation can be used synonymously. An international co-operation is seen to lay in-between of networks and partnerships and in practice, a line is oftentimes hard to draw (Ewijk and Baud, 2009, pp. 219–221). Especially when it comes to academic articles and scientific papers, the term *co-operation* is oftentimes used for every kind of link between two or more cities, making it nearly impossible to distinguish co-operations according to Ewijk and Baud's classification from other forms of networking activities (Ewijk/Baud, 2009, pp. 219–221), (Villiers, 2009, p. 149). Referring to Villiers et al. (2007), partnering agreements, which are called *co-operations* by the partners themselves, might also be partnerships according to Ewijk and Baud's definition. The concept of partnerships is described hereafter.

Partnerships

According to Ewijk and Baud (2009), a partnership distinguishes itself from other forms of international linkages in the way that a partnership is a "…highly structured form of co-operation with long-term commitments, concrete activities, a form of contract and participating partners able to operate autonomously". Equality, power and trust between the partners should be the main aspects of every partnership (Ewijk and Baud, 2009, p. 220), (Hewitt, 1999, p. 30). Villiers (2009) argues that partnerships between cities are comparable to alliances between organizations as they are often characterized by shared objectives, focus on long-term strategic goals, joint decision-making, commitment of resources, creating advantages for both parties involved, and driven by the same forces than alliances between organizations such as globalization (Villiers, 2009, p. 150). The terms (town) twinning, friendship links or sister cities have the same meaning as partnership. A partnership is therefore besides networks and co-operations the form of international linkages with the strongest ties between the partners (Ewijk and Baud, 2009, p. 220), (Hewitt, 1999, p. 30).

As this chapter focuses on city partnerships in particular, two further definitions for this kind of international linkage are introduced at this point. The first definition was made by the United Nations Development Programme (UNDP); the second definition is from the Council of European Municipalities (CEMR).

First Definition – United Nations Development Programme (UNDP)

A definition, which might apply to all existing city partnerships, is the following made by the United Nations Development Programme (UNDP). The UNDP (2000) defines a city partnership or linking as "…a long-term partnership between communities in different cities or towns. A link is a relationship signifying mutuality. A link enables partner communities to engage themselves in matters of mutual interest and which they themselves determine. The agenda is open." In this respect, the term community refers to citizens, the local government administration, community based organizations and other groups in rural or urban areas as well. The mutual interest can cover social, cultural, economic, technological or environmental issues and should lead to a situation, where both parties are able to learn and gain from each other (UNDP, 2000), (UN-Habitat & WACLAC [United Nations Human Settlements Programme & World Association of Cities and Local Authorities Coordination], 2003, p. 8). The most important part which characterizes a partnership is therefore mutuality (UNDP, 2000), (Johnson/Wilson, 2009, p. 216). The mutual interest is defined together by both cities as "generating positive stimuli for the economic development of both cities". Besides several specific goals, the cities identified the exchange of information, experiences and co-operation in EU projects as the basis for the partnership. Thus, it fulfills all prerequisites for being a C2C link according to UNDP.

Second Definition – Council of European Municipalities (CEMR)

The second definition regarding city partnerships was defined by the Council of European Municipalities and Regions (CEMR). According to CEMR (2008b), partnerships may be based on long-term twinning relationships – as the definition of the UNDP already reveals – but may also be limited to a defined period of time and a series of agreed activities or projects.

Altogether it can be said that the terminology regarding city networking can be really confusing and is not clearly defined in current literature. For this text, the terms C2C (project) partnerships, city/project partnerships, (international) co-operation, town twinning, twinning, twinning initiatives and C2C links are used synonymously to indicate the relationships between partner cities and project partners. Next, the current situation of city partnerships which are the relevant form of international co-operations is explained in more detail, starting with its origins and historical importance.

4.4 The Origins and Historical Importance of City Partnerships

Although C2C networks are due to the United Nations Millennium Goals and the increased commitment to problems of developing countries in more demand than ever before, the concept of cities co-operating with each other for mutual gain is nothing new (Keiner and Kim, 2007, p. 1372). Besides city alliances in ancient and medieval times, the present form of C2C linkages appeared after WWII. Constant development, increased professionalism and changes in terms of member countries, goals and motives throughout the decades after the last world war influenced the conclusion of new city partnerships considerably until the present form of C2C partnerships emerged (Hoetjes, 2009), (Buis, 2009, p. 191). The following paragraphs give a short summary about how C2C linkages and partnerships developed after WWII by referring to Hoetjes (2009), who identified six different layers or waves, which describe the changes in C2C networking during those decades.

First City Partnerships after WWII (First Layer of City Partnerships)

To start with, cities always engaged in some kind of partnership with other cities for mutual gain throughout history – for example the German Hanseatic cities. However, the modern concept of city partnerships evolved after World War II only, when an initiative to overcome the deadlocked conflicts between European countries, the European continent and the US was strongly needed (EC, 2010), (Ewijk and Baud, 2009, p. 218). Building up friendships, promoting peace, cultural and sporting exchange, international understanding and reconciliation of the different nations were the main goals of twinning then (Ewij and Baud, 2009, p. 218), (Villiers, 2006, pp. 2–3), (Hoetjes, 2009, pp. 157–159). Examples of some of the first links were partnerships closed between cities in the UK and Germany such as Bristol/Hanover or Oxford/Bonn (Villiers, 2006, p. 2). These first attempts of co-operation between war-participating countries had long-lasting consequences. According to the European Commission, "…[these twinning initiatives] were one of the most visible and lasting ways of bringing people from different countries together under the European banner" (EC, 2010a) and can be therefore seen as one of the first steps of European integration (EC, 2010a), (Villiers, 2006, p. 3), (CEMR, 2008a). Even until today, C2C linkages are used within the EU for drawing the different nations and cultures nearer to each other and for other political reasons (EC, 2010a), (Hoetjes, 2009, p. 159). Nonetheless, those first C2C partnerships were oftentimes limited to town halls and to an exclusive circle of politicians only, who met on a regular basis to deepen personal linkages and to facilitate cultural and sporting exchange. Many of the links closed during that period have become inactive over time (UNDP, 2000).

City Partnerships during the 1960s, 70s, 80s and 90s (Second to Sixth Layer)

During the 1960s, 1970s, 1980s and 1990s, the mechanisms of town twinning became of different importance to the world. Due to changes in economy, culture and politics, twinning between industrialized countries in Europe and North America became less and less popular. The primary reasons for twinning, which led to the conclusion of partnership agreements after WWII, were mainly out of use and many different objectives such as community development, which were not covered by C2C partnerships yet, attracted the attention of cities more and more (CEMR, 2008b), (UNDP, 2000), (Villiers et al., 2007, pp. 1–2). Although the period between the 1960s–2000 was characterized by many different waves of city partnership closings, which resulted from different objectives, but still overlapped in time, five main layers for city partnerships could be observed. Figure 7 illustrates those waves of city partnership closures starting from WWII (CEMR, 2008b), (UNDP, 2000), (Hoetjes, 2009, pp. 158–159).

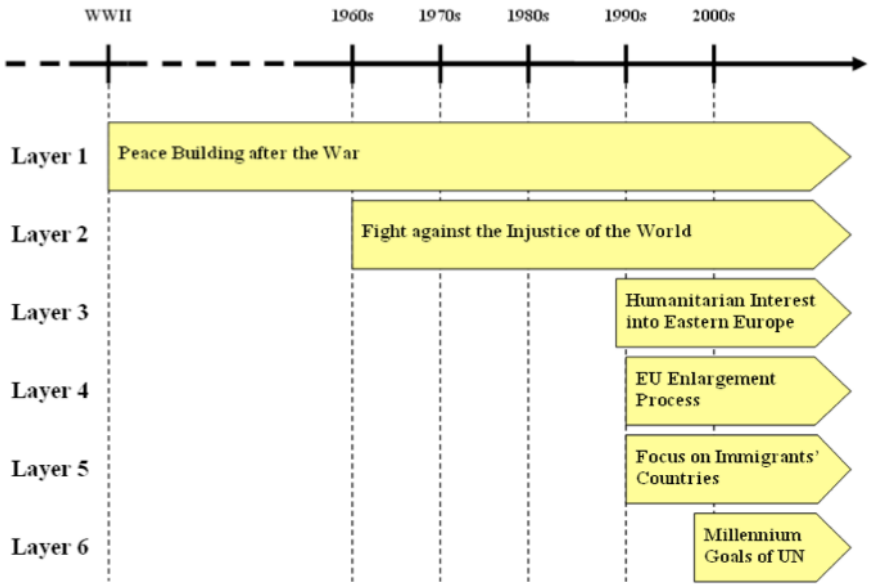

Figure 6: The Evolution of City Partnerships since WWII
Adapted from Hoetjes, 2009, pp. 158–159

Hoetjes (2009) concluded that after the first layer, which was driven by peace building after WWII, the desire to fight the injustice of the world system in favor of third world countries dominated partnership agendas in the 1960s (second layer). This was followed by a humanitarian interest into Eastern European countries after the fall of the Berlin wall leading to the conclusion of partnership agreements with cities located in that area (third layer). Both of those waves or layers were driven by civil society mainly and not by municipalities. Also in the 1990s, cities interested into C2C networking drew attention on Central and Eastern European countries because of the EU enlargement process (fourth layer). Furthermore, during the same time, cities started to establish contacts with municipalities, where their immigrants originated from (fifth layer) (Hoetjes, 2009, pp. 158–159). Besides the humanitarian and ideological reasons for closing C2C partnerships, it is also due to successful intervention by the UN that more and more city partnerships during the 1990s were not only set up between cities in industrialized countries anymore, but also with cities located in South America, Africa or Asia. These C2C networks are usually called North-South linkages in current literature, which refers to the fact that one sister city is located in one of the well-developed nations on the Northern hemisphere, whereas the other part is situated in developing countries in South America, Africa or Asia (UNDP, 2000), (Villiers, 2006, pp. 3–4), (Ewijk and Baud, 2009, p. 218), (Keiner and Kim, 2007, p. 1372). This trend is reflected in Hoetjes' sixth and last layer or wave, which, in his opinion, was mainly stipulated by the Millennium Campaign for Sustainable Development, which encourages municipalities to engage in C2C networking in order to achieve the UN Millennium Goals (Hoetjes, 2009, pp. 158–159). Buis (2009) summarized the motives for those layers. In his opinion there are three – the idealistic motive of peace and helping the poor, the political motive of supporting liberal movements or building opposition, and the economical motives of business opportunities, trade and investment.

In conclusion, it can be said that these six layers can be seen as the most important reasons why European and North American countries started to rethink their twinning strategies. Based upon those layers, further partnerships were usually closed after careful consideration only and for reasons, which might result into achieving practical results and long-lasting local development (CEMR, 2008b), (UNDP, 2000), (Hoetjes, 2009, p. 162). During the last years, C2C partnerships have become popular once again (Habitat International, 2009, p. 131). The reasons for this and the status quo of C2C links at the time being are described throughout the next chapter.

4.5 Status Quo and Trends of City Partnerships

Today, the concept of partner cities "…[is] a global phenomenon, which encompasses friendship, solidarity, culture, awareness-building, international understanding, humanitarian assistance, sustainable development and…good governance" (UNDP, 2000). This status is a consequence of almost 70 years of twinning initiatives, which were signed because of the aforementioned reasons and which are still valid. Therefore, city partnerships can be seen as a very complex political phenomenon, which has not lost its attractiveness throughout the years. The following chapter focuses on the status quo and trends, which can be observed in connection with town twinning. The global aspects of C2C links are mentioned, and the European twinning situation is examined in more detail as well. After this, the question of what partnership agreements look like nowadays is answered.

The Global Perspective of City Partnerships

To start with, C2C partnerships are a global phenomenon today. According to the United Cities and Local Governments [UCLG], about 70 percent of the world's cities and towns participate in some kind of international C2C co-operation programme, which amounts to about 15,000 to 20,000 towns in total (UCLG, 2010, p. 13), (Villiers et al., 2007, p. 1), (Tjandradewi et al., 2006, p. 358). Especially throughout the last years, C2C links attracted the attention of local, national and supranational policy makers once more, who recognized the potential of C2C co-operations for poverty reduction, institutional strengthening, democracy and peace building, and knowledge exchange. The concept of "global citizenship" and the adoption of the UN Millennium Development Goals contributed to the importance of C2C partnerships as well (Habitat International, 2009, p. 131).

However, the UNDP (2000) highlights that, despite this focus on problems which mainly concern developing countries, C2C co-operations between industrialized and developing countries are still rare – i.e. the majority of existing links is still connecting northern, developed countries. Many European cities are a good example for this paradox, among them is also the City of Graz (Austria). The city has concluded 16 partnership agreements, nine of them with cities located in countries of the EU and another five with cities of other European countries. Only two partnerships include cities outside of Europe, Zababdeh located in the Palestinian National Authority and Montclair in the US (City of Graz, 2010). It can be observed that especially European cities tend to mainly establish links with neighboring or cross-border cities (Hoetjes, 2009, p. 161). For this reason, the following paragraphs give some more information about the current twinning situation within Europe.

City Partnerships in Europe

Having a closer look on city partnerships in Europe, it can be noticed that only in Europe and between European countries, there have been about 34,000 listed twinning initiatives until now. The following exhibit, which was retrieved from CEMR's official website, shows the number of twinning initiatives per European country. Keeping in mind that CEMR only tracks European twinning initiatives, the numbers in Figure 8 show partnerships among European countries only; i.e. there is at least for each link one partner in another European country. Thus, the total number of twinning links in Europe and among European countries is estimated to be about 17,000 (CEMR, 2008a)

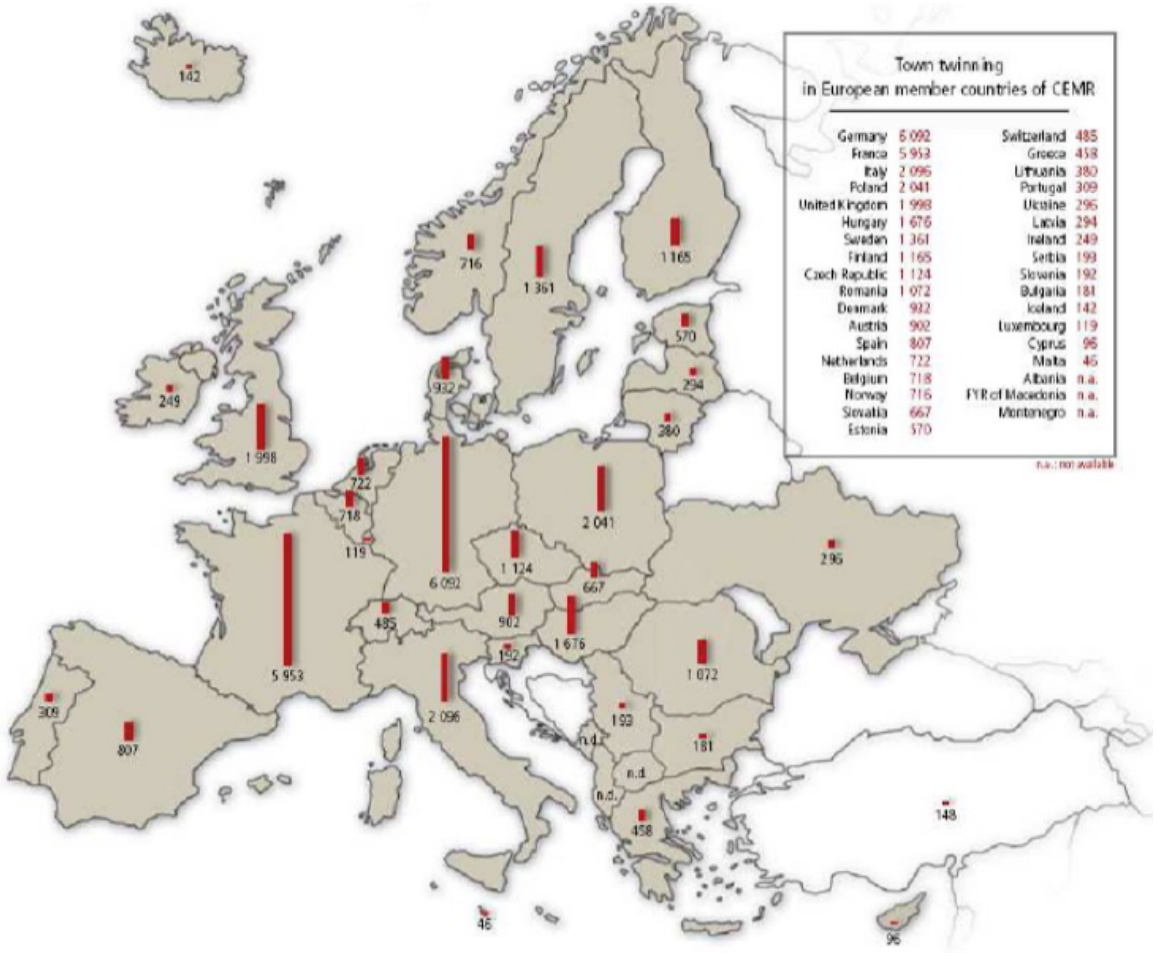

Figure 7: Town Twinning in Europe
Picture retrieved from CEMR, 2008a

As it can be seen above, Germany and France are the most active town twinners among European countries. Both of them have around 6,000 twinning initiatives with other European countries and about 2,220 with each other. Other countries with a high number of twinning links are Italy, Poland, the UK, Hungary, Sweden, Finland, the Czech Republic and Romania with about 1,000 to 2,000 twinning partners. Austrian cities have 902 official linkages altogether (CEMR, 2008a).

Although the number of twinning links that currently exist is that high, it seems that no city partnership around the globe is like another. Partnerships vary in terms of participating parties, objectives, resources and many more, leading to the fact that the possible combination out of those factors seems to be unlimited. Nevertheless, there are still lots of similarities between partnership agreements, which can be categorized. The following chapter is focusing on that.

4.6 City Partnerships – Towards a Classification

Keeping in mind that city partnerships tend to be unique agreements between one or more parties, C2C links still have similarities with each other. This chapter therefore focuses on the content of C2C agreements and how such partnerships might be classified. In particular, a framework for classifying city partnerships is developed and the different categories of this classification are introduced to the reader.

Developing the Framework

Thinking about the similarities between city partnership agreements in general, it can be said that all contract partners have to reach an agreement over the same issues, namely *Who are the parties involved? What are the goals and objectives of the partnership? What is the timeframe for the partnership? Who else shall/can participate in the partnership? Who else is supporting the partnership and how?* (UN-Habitat & WACLAC, 2003, p. 11). For facilitating reasons, these questions can be used to form categories for C2C partnerships, which could be used for classifying existing C2C (project) partnership agreements on their part. Table 2 summarizes those questions once again and illustrates how the questions could be transformed into categories.

	General Question	Sub-Question	Category	Dimensions within the Category
C2C Agreement	*Who are the parties involved?*	Where are the partner cities located?	**Geographical Scope**	- North-South - North-North - South-South - West-East - Global
		How is the partnership structured?/How many cities participate?	**Co-operation Structure**	- One-on-One - Groups
	What is the timeframe for the partnership?	Is there a timeframe?	**Duration**	- No specified ending (partnership agreement) - Specified ending (project partnership agreement)
	Who else shall/can participate in the partnership?	Which internal and external participants are involved into the partnership?	**Active Participants**	- Local authorities - NGOs - Private sector - Academic, research - National associations of local authorities
	Who else is supporting the partnership and how?	Where does the support come from?/In which form does the support come?/Why do the partner cities receive external support?	**External Support**	- Type of external support - Geographic focus - Funding and resources - Facilitating institutions
	What are the goals and objectives of the partnership?	–	**Objectives**	- social - cultural - economic - technological - environmental issues

Table 2: Classification of C2C Links
Adapted from UN-Habitat & WACLAC, 2003, p. 11

As it can be seen above, every C2C link can be classified according to six categories. The categories are the geographical scope of the C2C agreement, the co-operation structure, the duration of the partnership, the objectives, the participants actively involved into the partnership and external supporters. The first category, the geographical scope of a partnership agreement, refers to the geographical location of the partners. It can be either North-South, North-North, South-South, West-East or global. C2C links can have two forms of co-operation structures, namely a one-on-one form or a group structure. Furthermore, active participants involved into the partnership can be local authorities, NGOs, individuals and companies from the private sector, academics, researchers, or national associations of local authorities. Next, external support has got several sub categories, which involve the type of external support, the geographic focus of the support, funding and resources, and the facilitating institutions. Finally, objectives tend to differ widely. The most commonly used are focused on social, cultural, economic, technological or environmental issues (UN-Habitat & WACLAC, 2003, p. 11). The different categories are described throughout the following paragraphs in more detail.

Geographical Scope

Starting with the geographical scope, links can be categorized by using the city's geographical location. Partnership agreements can be either North-North, North-South, South-South, West-East or global linkages. This classification is used in many academic articles and other publications regarding city partnerships as well. In this case, a North-North linkage means that both partners are located in well-developed countries in the north, e.g. the partnership agreement between Graz (Austria) and Darmstadt (Germany) is a North-North link (UNDP, 2000), (UN-Habitat & WACLAC, 2003, p. 8), (City of Graz, 2010). A North-South linkage refers to the fact that one sister city is located in one of the well-developed nations on the northern hemisphere, whereas the other part is situated in developing countries in South America, Africa or Asia (UNDP, 2000), (UN-Habitat & WACLAC, 2003, p. 8). Hewitt (1999) is evaluating such a North-South link. In his case it is Toronto (Canada) and Sao Paulo (Brazil). Accordingly, a South-South partnership is a partnership between cities located on the southern hemisphere and a West-East link is an agreement between a well-developed city on the western part of the northern hemisphere and a town on the eastern part of the northern hemisphere such as Eastern Europe or the Middle East (UNDP, 2000), (UN-Habitat & WACLAC, 2003, p. 8). Having a look at Graz's partner cities, it can be noticed that most of the agreements can be categorized as North-North linkages while only a few, such as the project partnership agreement with Zababdeh which is located in the Palestinian National Authority, are North-East based (City of Graz, 2010).

Co-operation Structure

The co-operation structure between the partners is another point, which distinguishes city partnerships from each other. The structure can be either one-on-one or a group structure, meaning that the city partnership or project partnership agreement can involve only two cities or a group of cities. At this point, it has to be noted that city partnerships, which are formed by a group of cities, are not equal to city networks, which were described in sub-chapter 4.3 'Terminology' (UN-Habitat & WACLAC, 2003, p. 8). All of Graz's partner links, except the one with Darmstadt and Trondheim, are examples for a one-on-one structure, which means that the city has closed agreements with only one city at a time – every link, except with the two cities mentioned before, is verified in an own agreement.

Active Participants

Furthermore, active participants can also vary from partnership to partnership. Possible actors besides the parties who sign the partnership agreement, can be local authorities, NGOs, people or companies from the private sector, academics and researchers, and/or national associations of local authorities (UNDP, 2000), (UN-Habitat & WACLAC, 2003, p. 8). The City of Graz determined several possible participants in its internationalization strategy (City of Graz 2006). Accordingly, possible partners might be the 'Internationalisierungscenter Steiermark (ICS)', the universities and universities of applied sciences, the province of Styria, as well as the diplomatic missions of the respective countries or regions (City of Graz, 2006, pp. 1–6).

External Support

Although projects, which are based on a C2C co-operation agreement, are in the sole responsibility of the contract partners, there are several national, international and private organizations which might support the partners in the achievement of their goals. Examples are national/international NGOs such as Sister Cities International, national governments, the World Trade Organization (WTO), the World Bank, the EU, professional organizations and many more. These institutions can support the project partners in different ways without being in the position to influence the (project) partnership agreement itself. Possible supportive measures by those institutions are strategic capital investments, training and human resource development, consulting in various fields etc. Financial support could come in the form of grants, loans or the allocation of individual budgets. Additionally, many organizations have projects with special geographic focus, for example for Latin America or North Africa. The Phare Programme provides a practical example in this context (UNDP, 2000), (UN-Habitat & WACLAC, 2003, p. 8), (EC, 2010b), (Andreasson and Königson, 2009, p. 1–2). According to Bontenbal (2009), external support by such organizations is especially important for small and medium-sized municipalities, which are oftentimes limited in their financial resources, whereas large cities are able to come up with budgets for international co-operations on their own (Hoetjes, 2009, pp. 160–161). Johnson and Wilson (2009) examined the case of two partnerships between cities located in the UK and Uganda, one of them was mainly funded by the World Bank (Johnson and Wilson, 2009, p. 211). At this point, it seems to be necessary to refer to the sub-chapter "External Institutions Interested into City Partnerships", which also includes some remarks on the aforementioned Phare Programme.

Objectives

Last but not least, the partnership's objectives are another important point, which has to be discussed by the partner cities and which might be used for classifying existing partnership agreements. Regarding objectives, it has to be said that according to the partner cities' location and the period in which the partnership agreement was concluded, objectives tend to differ widely. It seems that many city partnerships, especially among North-North partners, have less stringent objectives like goodwill or friendship, whereas others, usually North-South linkages, are based on very specific goals and timeframes (UNDP, 2000). Focusing on the first group of partnerships, which were mainly set up in the post-war era until the 1980s, it seems that today, those contacts are mainly used for cultural, sportive and educational purposes. Examples could be invitations for festivals, exhibitions and competitions, or exchange programmes for students, certain occupational groups or others. For the latter group, which mainly includes partnerships closed throughout the last decades, the most common objectives are related to community development and the assistance cities can give to each other in various other areas. Those might refer to meeting basic needs, awareness-raising, municipal capacity-building, matters of governance, strengthening local democratic institutions and furthering wider community participation in every aspect of city life (UNDP, 2000), (Hewitt, 1999, pp. 27–28), (Villiers et al., 2007, p. 2), (Buis, 2009, pp. 190–194). As those are some of the most popular objectives used for newly closed C2C co-operations, they shall be described briefly hereafter.

Meeting Basic Needs. Firstly, in terms of meeting basic needs, the improvement of living conditions connected with the development of basic urban services such as health care for poor people is one of the most vital aspects tackled in international C2C co-operation – especially in North-South partnerships (Bontenbal and Lindert, 2008, pp. 465–467). However, this objective is seen to be quite controversial as it was observed that large international NGOs are able to cover the same topics in an oftentimes more professional way than it is possible for city administrations (Nitschke et al., 2009, p. 138). Volunteer involvement in international co-operations might be decreased therefore, as it seems to be more efficient to engage professionals for doing the same job (Hoetjes, 2009, p. 162).

Awareness-Raising. Next another, oftentimes underestimated factor is awareness-raising. Awareness-raising takes place when people work together closely over a longer period of time. Getting more and more involved with the other parties' problems and way of thinking, urban and private actors involved into the twinning initiative start to build up cultural understanding. Pointing out the fact that many town twinning agreements were closed between cities with constant migration flows, cultural understanding built during town twinning projects can be used to facilitate the integration of these migrants into the own community (Ewijk and Baud, 2009, p. 219), (Hewitt, 1999, p. 30), (Lindert, 2009, pp. 173–174). Lindert (2009) notes that awareness-raising is also linked to fund-raising in many cases and is therefore the aim of many partnerships as well.

Municipal Capacity-Building, Matters of Governance, Strengthening Local Democratic Institutions and Furthering wider Community Participation. Lastly, municipal capacity-building, matters of governance, strengthening local democratic institutions and furthering wider community participation in every aspect of city life are strongly interrelated with each other. Municipal capacity-building means building up and developing local urban administrations – a precondition for everyday life in urban areas. This objective is especially popular with countries which had to face a major political swift in recent years, for example former Soviet nations, which transformed from Communist ruling to democracy (Bontenbal, 2009a, pp. 181–182), (Bontenbal, 2009b, pp. 100–101), (Bontenbal and Lindert, 2008, p. 467), (Lindert, 2009, p. 173). According to Abrahamsen (2004), one of the greatest challenges of municipal capacity-building is to avoid exporting (northern) administration structures or plans. It is the task of the more developed partner to assist the less developed city administration in developing their own structure, which shall respond to the city's individual challenges, instead of providing a developed solution. Next, objectives related to matters of governance are mainly popular with North-South linkages and good governance can help to increase the quality of live in urban areas and to decrease poverty (Bontenbal and Lindert, 2008, pp. 465–467), (Bontenbal, 2009b, p. 100–101). Furthermore, furthering wider community participation in every aspect of life is another objective which can be tackled by C2C co-operations. On the one side, the partner, who is in need of more community participation, can be supported in efficiently responding to its citizens' needs and in encouraging them to contribute actively to the city's management. Thus, people learn that everybody can contribute his or her part to improve the society. Furthermore, it can be said that decisions, which influence the people's life a lot, should only be made after the people's opinion is considered as well. On the other side, the partner, who is giving the assistance to the one who is in need of more community participation, gets the chance to involve its citizens actively in the partnership initiative in order to create awareness locally and to foster the idea of global citizenship (Bontenbal, 2009a, p. 182), (Bontenbal and Lindert, 2008, p. 469–470).

To sum it up briefly, although C2C partnerships are unique agreements between two or more parties, it is still possible to identify similarities between such international links. Those can be observed in particular when having a look at the geographical scope of the agreement, the co-operation structure, the duration of the partnership, active participants involved, external support and objectives, as every city partnership agreement usually focuses on those areas. As it was already mentioned before, city partnerships are not only supported by the parties, who signed the agreement, but might also attract the attention of others, mainly supranational organizations. The most important ones are introduced throughout the next chapter.

4.7 External Institutions Interested into City Partnerships

According to the UNDP (2000), city partnerships are determined by the partner cities solely. However, there are numerous national and international organizations who support and/or influence partnerships as well. This support can come in the form of financial assistance, training, consulting and others – usually combined with rules and regulations (UN-Habitat & WACLAC, 2003, p. 8). Some of the most important organizations and institutions are for example the UNDP, the European Commission, or People to People International and Sister Cities International. All of them are described briefly at this point.

UNDP

The United Nations Development Programme (UNDP) is a UN organization responsible for supporting countries in finding solutions for global and national development challenges. Advocating the UN member states, developing strategies and monitoring their progress are the core areas of the organization. The UNDP focuses on the achievement of the UN Millennium Development Goals. Special attention is paid to the areas of local capacity, democratic governance, poverty reduction, crisis prevention and recovery, environment and energy, HIV/AIDS, and the empowerment of women. The UNDP uses networks and connects countries for knowledge, experience and resource exchanges. Town twinning was named by the organization as one important tool in order to achieve those goals and is therefore supported by the organization (UNDP, 2010), (Nitschke et al., 2009, p. 136).

European Commission

For countries within the EU, town twinning is supported by various EU programmes. Among them are for example the 'Europe for Citizens programme', which is part of the union's Citizens' Policy, or the Phare programme which is focused on the Union's enlargement process. Both of those programmes will be described shortly at this point to give an idea how town twinning can be integrated into large scale programmes.

Europe for Citizens Programme. To start with, the current Europe for Citizens programme is open for all EU members and Croatia for the period 2007 to 2013, following the programme of period 2004 to 2006. Further potential candidates for this EU initiative include Iceland, Liechtenstein, Norway, Macedonia, Turkey, Albania, Bosnia and Herzegovina, Montenegro, Serbia and Kosovo (EC, 2009, pp. 4–5), (EC, 2009, pp. 19–20). The Europe for Citizens programme seeks to encourage European citizens to be actively involved into the process of European integration, to develop a common sense of European identity and to enhance mutual understanding. Besides participatory citizen's projects, town twinning is explicitly named as a tool to achieve these goals. Town twinning projects, which show a commitment to European integration, which build friendships and which promote active participation among citizens, are granted with EU funds. In 2003 for example, 1,328 out of 2,136 projects were selected for the programme with most of them taking place in France (347), Germany (338), and Italy (175) (EC, 2010).

Phare Programme. On the other side, the Phare programme is focused on the Union's enlargement process and the preparation of candidate and potential candidate countries for membership in the EU. For the time being, candidate countries are Croatia, Iceland, Macedonia, Montenegro and Turkey. Potential candidate countries are Albania, Bosnia and Herzegovina, Kosovo and Serbia. Projects covered by Phare include institutional and capacity-building in the candidate countries. This shall ensure that the candidate countries can adapt to the Union's acquis communautaire (The acquis communautaire is the body of common rights and obligations in the European Union). Twinning initiatives are one of the programme's main instruments to meet these objectives (EC, 2010b), (European Parliament, 4 December 1998), (Dixelius/Haglund, 2003, pp. 3–4).

People to People International and Sister Cities International

People to People International (PTPI) and Sister Cities International (SCI) are both US non-profit organizations, which want to promote peace through creating and strengthening partnerships between citizens of US and international communities. Going back on Eisenhower's citizen diplomacy initiative, mutual understanding, peace and co-operation among people and communities are the goals of the two organizations. Whereas PTPI is focused on connecting individuals, SCI is concentrating on cities, counties and states (SCI, 2010), (PTPI, 2011).

These organizations are some of the most prominent supporters of twinning initiatives at the time being. However, there are many more. After this general introduction to city partnerships, its historical evolvement, the status quo, city partnership agreements and organizations supporting C2C initiatives, the following chapter summarizes concluding remarks on the topic of city partnerships by focusing on key findings made by cities engaged into city partnerships.

4.8 Findings Regarding City Partnerships in the Literature

Besides many official publications from organizations such as the UN and the EU, which primarily focus on development issues, city networks, projects and financial support, current literature about city partnerships is oftentimes analyzing and evaluating existing partnerships and projects. Some of the most important findings out of those papers are introduced at this point in order to conclude the theoretical introduction to city partnerships. These lessons learned by different European municipalities give an idea of what a city has to take care of when dealing with city partnerships. In particular, the following paragraphs discuss the issues of prerequisites for successful city partnerships, mutuality and equal distribution of power, and selecting objectives and working on projects. Furthermore, a model developed by Villiers (2009) regarding the formation and management of C2C partnerships is introduced.

Prerequisites for Successful City Partnerships

According to various authors, the prerequisites for successful C2C partnerships and C2C partnership projects are, on the one hand, enough resources and, on the other hand, dedication of the parties involved.

Resources. In the case of city partnerships, current literature implies that necessary resources for networking activities are not only money, but also time, staff and expertise. In terms of money, Nitschke et al. (2009) highlight that municipalities are oftentimes not able to support their partner cities to a full extent as the legal security and the financial support by the government does not allow for it. Furthermore, they say that limited financial resources and structural changes in municipalities diminish the dedication to support other communities (Nitschke et al., 2009, p. 135). This is also supported by Bontenbal (2009b), who notes that especially small and medium-sized municipalities are limited in their efforts. Additionally, she also mentions that "clear political mandate for international co-operation, the human capacity available […] and the extent of additional external funding" are the key factors for twinning in a northern partner town. For the south, she argues that an international co-operation department has to be in place, which is able to facilitate, promote and sustain international contacts (Bontenbal, 2009b, p. 103). Besides financial aspects, high staff turnover in projects is also a challenge (Tjandradewi et al., 2006, p. 372). Thus, it can be said that more resources might also lead to better outcomes (Wallberg, 2000, p. 27), (Nitschke et al., 2009, p. 137), (Hewitt, 1999, p. 42). Additionally, Ewijk and Baud (2009) mention the importance of the resources' perceived usefulness in order to increase the potential for mutual learning, co-operation and successful projects (Ewijk/Baud, 2009, p. 220), and Tjandradewi (2009) highlights community-wide participation (Tjandradewi et al., 2006, p. 360), (Tjandradewi/Marcotullio, 2009, p. 168).

Dedication. Dedication is another key factor for successful C2C initiatives. Johnson and Wilson (2009) give a good example, which combines the problem of limited financial resources and dedicated project partners. In their article "Learning and mutuality in municipal partnerships and beyond: A focus on northern partners", they examine amongst others the partnership between Iganga in Uganda and Daventry in the UK. The partnership project between the two cities ended in 2000 because of financial reasons. However, afterwards the "Daventry Friends of Iganga" NGO was founded by engaged officers, politicians and other members of the community in order to work on projects with and for Iganga in their spare time (Johnson/Wilson, 2009, p. 211), (Hoetjes, 2009, p. 161). Dedication is also related to mutual understanding. Parties, who have developed mutual understanding, are able to better understand their counterparts and to partly overcome other inequalities such as cultural differences. Thus, the parties are more willing to invest time and resources into the project and the co-operation is more likely to succeed. This is also supported by Buis (2009), who argues that understanding each other, each other's circumstances and challenges together with high political commitment on both sides establish the most important prerequisite for success in C2C partnerships. Bontenbal (2009b) concludes that mutual understanding can be oftentimes traced back to the fact that partners had to face the same situations or share other characteristics with each other. Therefore, C2C partnership projects are seen to be more successful in general when the parties have common problems or share other things with each other (Bontenbal, 2009b, p. 105), (Wallberg, 2009, p. 9), (Hewitt, 1999, p. 31), (Hosaka, 1993, p. 135), (Tjandradewi et al., 2006, pp. 361–362). This is also supported by the UNDP, which suggests that mutual understanding and reciprocity are preconditions for successful C2C co-operations (Ewijk/Baud, 2009, p. 220), (Tjandradewi/Marcotullio, 2009, p. 168), (Tjandradewi et al., 2006, p. 360). In this context, Ewijk/Baud (2009) mention that partnerships focusing on migrant countries have advantages over other north-south links. However, although similarities between the partners are good for mutual understanding, differences are important for learning opportunities as well (Johnson/Wilson, 2009, p. 212), (Devers-Kanoglu, 2009, p. 204). Villiers et al. (2007), who tried to validate observed success factors of city partnerships through empirical testing, also came to the conclusion that partner commitment, understanding, cultural sensitivity, positive partner attitude, and similarities of personalities on both sides have a significant positive impact on the success of partnerships (Villiers et al., 2007, pp. 9–10).

Mutuality and Equal Distribution of Powers

One aspect, which is heavily criticized throughout existing literature, is the fact that C2C partnerships still lack mutuality and equal distribution of powers, especially when it comes to north-south partnerships. The northern partner usually retains the power because of money, expertise and information, whereas the southern partner is oftentimes forced to accept what the northern partner is dictating. Thus, it can be said that the north is usually the donor whereas the south is the recipient in what they call a partnership (Bontenbal, 2009b, p. 105), (Abrahamsen, 2004, p. 1454), (Bontenbal and Lindert, 2008, p. 479), (Ewijk and Baud, 2009, p. 220), (Devers-Kanoglu, 2009, p. 207), (Hewitt, 1999, p. 42). Although there are already tendencies that the less developed partner is heavily integrated into the project development phase, much has to be done yet (Abrahamsen, 2004, p. 1459), (Hosaka, 1993, p. 133). This problem of unequal distribution of powers is that significant because projects, which were developed only by one party, are more likely to fail. According to the World Bank, which was cited in Abrahamsen (2004), this is especially true when it comes to policy and institutional reforms as those should not be imported or imposed, but must be home grown. Therefore, Johnson and Wilson (2009) suggest that this inequality in distribution of powers should be replaced by new relationships and engagement on both sides. Thus, also conflicts between the two partners could be reduced (Bontenbal and Lindert, 2008, pp. 379–380). Furthermore, mutuality implies that information sharing must not be a one way flow from north to south, but should involve both parties. According to Ewijk and Baud (2009) and Devers-Kanoglu (2009), there are several learning possibilities for more developed partners as well. Among them is for example gaining information about innovations in less developed governances (Ewijk and Baud, 2009, p. 221), (Devers-Kanoglu, 2009, p. 202). Buis (2009) concludes that open discussion of motives, joint analysis of problems, joint steps in implementation, joint review of progress, and joint monitoring and evaluation are necessary for successful partnerships.

Selecting Objectives and Working on Projects

Next, the question of which objectives to choose and how to work on projects is another issue, which was already discussed by various researchers. In general, it can be said that it seems that some objectives are better for co-operations between certain cities than others (Tjandradewi and Marcotullio, 2009, p. 168). Municipalities are often more willing to work on projects in areas with which they are familiar with. To give an example, Andreasson and Königson (2003) examined Swedish twinning initiatives aimed at improving living conditions for the urban poor in slums of developing countries. They noted that only six out of the 33 projects, which they evaluated in their paper, were slum-related, the rest focused on other issues. They concluded that the reason for this could have been that Swedish municipalities have no practical experiences with slum-related problems and were therefore also not able to share relevant knowledge about it. In their case, the general focus on improving living conditions for the urban poor has therefore been shifted towards other objectives, which were more familiar to Swedish municipalities (Andreasson and Königson, 2003, p. 1). Accordingly, it can be said that it might make more sense if the twinning co-operation's objectives are selected by the parties who are directly involved into the project as objectives, which are set by external partners or only one party, are sometimes out of touch with reality. This is also true for financial issues. More precisely, budgets or funds allocated by external institutions, which oftentimes come hand in hand with external regulations regarding the length of a project or others, might not fit to the situation and the twinning partnership at hand. Another problem is established by definitions that are made by such external partners. The terms *achievement* and *development* might be mistaken by one or more parties involved into the twinning initiative – purpose and results of the partnership have to be clear to both sides (Buis, 2009, p. 192), (Wallberg, 2000, pp. 2–4), (Lindert, 2009, p. 173). Furthermore, projects and objectives, which were set by only one twinning partner – usually in the north, are also more likely to fail. The reason for this is that those projects are sometimes not targeted on what really has to be done in the partner municipalities (Nitschke et al., 2009, p. 139). The northern partner should keep clearly in mind that southern municipalities have their own expectations and ideas about what has to be done (Bontenbal, 2009b, p. 103). Additionally, it has to be mentioned that Villiers et al. (2007) proved empirically that partnerships are more likely to succeed where projects are based on a business plan as well as extensive communication and where the management of the partnership is of high quality (Villiers et al., 2007, pp. 9–10), (Villiers, 2009, p. 150). Buis (2009) mentioned regular contact as a success factor as well.

As those lessons learned seem to be relevant, the most important issues of this chapter are summarized in the following table.

Prerequisites for Successful City Partnerships	**Resources** - Money, staff and expertise **Dedication** - Of all parties involved - Compensates lack of resources to a certain extent - Mutual understanding
Mutuality and Equal Distribution of Powers	- Donor vs. recipient of money, expertise and information – has to be avoided - Mutual project development leads to better results and less conflicts - Two-way flow of information
Selecting Objectives and Working on Projects	- Choose familiar topics - Objectives and financial issues have to be developed by the partner cities and not dictated by one party - Regular contact and extensive communication - Having a plan and good management of that plan

Table 3: Findings Regarding City Partnerships Retrieved from Current Literature

In addition to those learnings, Villiers (2009) has developed a conceptual framework of city-to-city partnership formation and management, which is described in the following text.

Villiers' Conceptual Framework of C2C Partnership Formation and Management

The following figure, which was developed by Villiers (2009), illustrates six steps for effective formation and management of C2C partnerships, namely (1) strategize, (2) identify, (3) evaluate, (4) negotiate, (5) implement and learn, and (6) alliance capability.

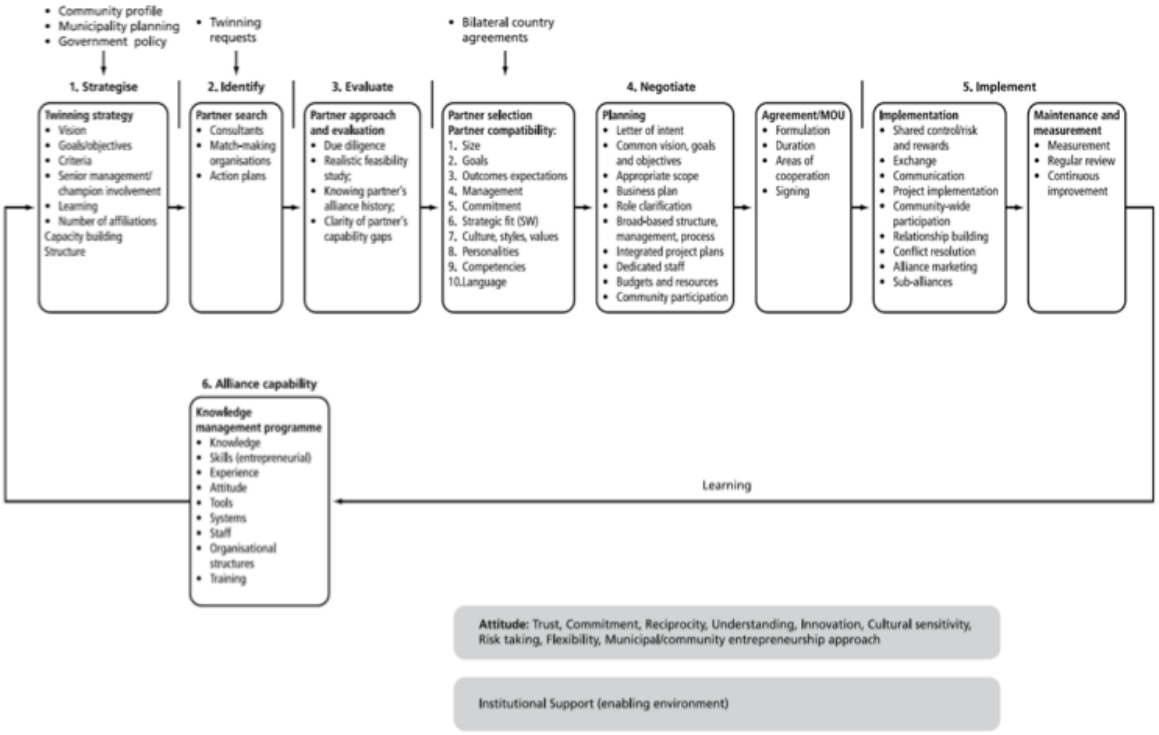

Figure 8: A Conceptual Framework of C2C Partnership Formation and Management
Picture retrieved from Villiers, 2009, p. 151

Step 1 'Strategize' suggests that every city, which wants to be connected to other cities via partnership agreements, needs to formulate a general alliance strategy first of all (i.e. an internationalization strategy) and determine criteria for partner selection. Then, step 2 'Identify' can follow, which refers to looking for possible partner cities that meet the criteria determined throughout the alliance strategy. Furthermore, those cities have to be evaluated (step 3 'Evaluate'), and preferred partners selected (step 4a 'Negotiate'). This is followed by a negotiation phase and the signing of an agreement (step 4b and step 4c 'Negotiate'). Afterwards, step 5 'Implementation' starts. This phase includes the co-operations between the partners (step 5a), and further the maintenance and measurement of the relationship (step 5b). In the end, the city should learn from that process and develop alliance capability through experience, which might influence the city's alliance management in future. Thus, this framework can be seen as an ongoing cycle (Villiers, 2009, pp. 151–154).

Altogether it can be said that those lessons learned by different municipalities, which were located in European countries mainly, provide insights on avoiding and/or solving problems related to city partnership activities.

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5 System of indicators for measuring performance development of cities

Nothing focuses the mind better than the constant sight of a competitor who wants to wipe you off the map. (Wayne Calloway)

Recommended additional reading:

- Annoni, P., & Dijkstra, L. (2013). *EU Regional Competitiveness Index 2013*. JRC Policy and scientific reports. Retrieved from Portal European Commission. https://ec.europa.eu/jrc/sites/default/files/lbna26060enn.pdf
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5.1 Chapter Overview

Recognizing that cities are becoming generators of economic development and a source of growth for the national economy, there is an increasing urge to identify the stages of development and positioning of cities upon which the adequate preparation of strategic and development guidelines is dependent. Comparison upon the level of their development efficiency calls for indicators, which measure the performance of cities, are representative and comparable between countries. In the case of medium-sized cities we consequently have to question the applicability of the methodology and indicators used mostly in cases of large, global cities by internationally recognized institutions. With the established set of qualitative indicators and assistance of computer program for multi-parameter decision-making processes (DEXi) this chapter also seeks to compare the performance development of selected European cities.

Learning outcomes

By the end of this chapter successful students will be able to:

1. Understand the theoretical background and applied practice for measuring performance of cities
2. Understand selection criteria for cities and indicators
3. Understand the multi-attribute decision – making
4. Interpret results of comparison.

5.2 Introduction

Existing methodologies of comparison in the field of city performance and quality of urban city structure affect more or less a wider field of urban and regional disparities, wherein specific approaches cover only limited areas. Hence, Nijkamp (1986, p. 1–21) focuses exclusively on infrastructure impacts, Callois and Aubert (2007, p. 809–821), however, empirically analyze the impact of social capital on regional development. An overview of sustainable development indicators give Singh et al. (2009, p. 189–212) as well as Slottje (1991, p. 684–693), Somarriba and Pena (2009, p. 115–133), but the interpretation of the quality of life indicators is missing. In the field of competitiveness Winter (2010, p. 52–53) presents synopsis of indicators measuring urban competitiveness on a European scale, while Parris and Kates (2003, p. 559–586) indicate the multilayered nature of sustainable development and consequently incompleteness of a measuring indicator's clear definition. Missing thematic indicators can also be found in the context of measuring regional disparities at the broader level of the European countries (Tausch et al. 2007; Oliveira Soares et al. 2003, p. 121–135). Comparing cities by the use of indicators, representing diverse aspects of urban life, is only possible with the meaningful formation of structured system; simply adding many of indicators to obtain a single index may result in criticism of uncertainty. Similar effects can also be reached by using a larger set of non-aggregated indicators; therefore identification of appropriate, small number of relevant indicators is crucial. In the process of system formation, inclusion of indicators with higher impact on the general differences between selected cities in different countries is necessary, at an additional assumption of environmental, human and social capital as well as the demographic point of view's integration.

In this paper we want to present the concept of measuring the urban development, based on different theoretical background and applied practices, through which the most appropriate, tailored concept (European Common Indicators or ECI) is introduced as the baseline for the study, considering the specific criteria, followed by selection of the qualitative, descriptive performance development indicators. Based on the structure and categorization of gathered data (by survey, taken in 5 EU cities), the applied DEXi method is introduced as the option in the multi-criteria decision making process (city management). The method's case applicability is further discussed by the results and their interpretation.

5.3 Theoretical background and applied practice

In accordance with the Charter on European Sustainable Cities and Towns Voula (1996, p. 133–154) lists six key areas of sustainable development and urban transformation: the active city/town, beautiful town, green city/town, town with a better environment, cooperation for a better city, and the town catalogue. The strategy of urban sustainability consequently includes urban performance indicators such as: 1) local involvement (citizen's participation), 2) employment, 3) city deficit, 4) economic growth, 5) urban mobility, 6) urban metabolism, resources, consumption, 7) environment and social expenditure, 8) urban safety, 9) public health, 10) social justice, and 11) global change.

Indicators of sustainable development show the complex and dynamic structure of the urban surroundings. After adoption of Agenda 21 (1992) this type of indicators developed many institutions (e.g. United Nations – Urban Indicators Program, World Health Organization (2009)) as the analytical tools for studying the quality of life in the urban environment. The wider set represent also SUD-LAB European Commission project's indicators with an extended database of European cities, where indicators are divided into the following categories: a) air quality, b) composed environment, c) cultural endowments, d) social disparities, e) transportation quality, f) urban administration, and g) waste management (Bănica 2010, p. 340).

Bănica (2010) defines the *index of local development* as an integrated indicator, including the importance of individual elements (weights), namely, category of infrastructure (4), followed by the economy (3), local community (2) and public administration (1):

$$I_{di} = \frac{4 I_i + 3 I_e + 2 I_{HE} + 1 I_{PF}}{4 + 3 + 2 + 1} \quad (1)$$

meaning:

I_{di} – *local development index,*

I_i – *infrastructure index:* utilities, transport and health infrastructure, natural resources,

I_e – *local economy index:* financial services and insurance, labour and public budget,

I_{mc} – *local community index* (community spirit): safety of citizens, tourist attractions, cultural / sports facilities, and cultural / historical heritage.

I_{ap} – *public administration index:* services and support to small and medium-sized enterprises, urban planning, communication and information dissemination.

5.4 Selection of cities

Methodology for the comparison of medium-sized cities includes selection of an appropriate sample, defined by*: location (*criterion 1: European cities), *inclusion in the databases* (criterion 2: city's inclusion in Urban Audit database), *definition in terms of a smart city* (criterion 3: city is placed in the Smart Cities base), *comparability in terms of the urban size* (criterion 4: population size: from 100,000 to 200,000 inhabitants) and *regional significance* (criterion 5: capital of the region or an important regional centre). The cities that have fulfilled the above stated criteria and were included in our research are Maribor (Slovenia), Pleven (Bulgaria), Linz (Austria), Erfurt (Germany), Trieste (Italy), and Brugge (Belgium).

5.5 Selection of indicators

The selection of qualitative indicators results from conceptual understanding of *urban sustainability* indicators, based on the ECI – European Common Indicators, first established in the period 1999–2003 under the guidance of the research institute Ambiente Italia. Among more than 1,000 indicators, reflecting trends in urban development in accordance with the principles of the social inclusion, local governance and democracy, local/global city integration, local economy, environment, cultural heritage, and quality of the institutional environment, in the context of ECI 10 key indicators, pointers of sustainable development of European cities were selected (Ambiente Italia 2003; Riga City Council 2005):

area 1: citizens' satisfaction with the local community – *indicator 1: average satisfaction with the local community,*

area 2: local contribution to global climate changes – *indicator 2: CO_2 emissions per capita,*

area 3: local mobility and transportation – *indicator 3: percentage of trips by private motorized transport,*

area 4: availability of local public open areas and services – *indicator 4: percentage of people, living within 300 meters of a public open area > 5000 m^2,*

area 5: quality of the local ambient air – *indicator 5: emissions of particulate matter (PM_{10}),*

area 6: children's journeys' to and from school – *indicator 6: percentage of children going to school by car,*

area 7: sustainable management through the local authorities and local enterprises – *indicator 7: percentage of environmental certificates with reference to the total of enterprises,*

area 8: pollution (noise) – *indicator 8: percentage of the population exposed at night to noise levels >55 dB,*

area 9: sustainable land use – *indicator 9: percentage of protected areas,*

area 10: products promoting sustainability – *indicator 10: percentage of population favouring "sustainable products".*

The quoted methodology that we found suitable for the study's baseline, was developed according to a bottom up approach, involving local authorities as the main actors in the process and improving synergies with the existing indicators set. This showed, on the one hand, to what extent the ethos (fundamental values peculiar to a specific person, people, culture, or movement) was actually based upon understanding the real needs of municipalities, and on the other, the possibilities of achievement of policy objectives for actions that shall bridge more than one level of governance. Indicators initiative was focused on monitoring urban sustainability at the local level, with the aim to help a local authority, interested in beginning to monitor the progress in the field of quality of its urban environment. Towns and cities can adapt the proposed set of 10 indicators to suit local circumstances. Respondents' distribution (from 14 EU countries) covered all classes of urban dimension (cities or aggregations of cities): 13 large (population > 350,000), 18 medium-sized (100,000 < population < 350,000) and 11 small (population < 100,000).

For countries and their cities (especially on a European scale, in transition countries and consequently, Slovenian cities) with a smaller population settlement, measurement concepts, formerly presented in the introductory part of this chapter may be partially or wholly inadequate. The selection of meaningful indicators, tailored to a specific city sample (e.g. medium-sized, European), situation and decision-making problem (city management), depends on the defined focused areas of city development. Selection of appropriate indicators in terms of narrow, specific measurement for future development's effectiveness from this perspective proves to be relevant.

The ECI concept was used in the study due to its successful implementation and effective city policy development's purpose. Based on its principles (the measurement method, definitions and scale values, which will be presented in sub-chapter 5.7, by introducing the specific areas from 1 to 5, qualitative performance indicators of urban development were selected in the study (Table 4).

Indicator	Scale value			
Perception of local community				
The overall level of satisfaction with the local community	very satisfied	moderately satisfied	unsatisfied	
Public transport	easy accessible	difficult to access	inaccessible	
Social and health services	Appropriate	acceptable	unacceptable	
Quality of the institutional environment	High	solid	unsatisfactory	
Education (number of educational facilities in your city)	1	1–5	more than 5	
Accommodation options and accessibility	high	medium	low	
Employment opportunities	frequent	occasional	rare	
Local mobility				
Systematic displacements (home – school and home – work)	private transport	public transport	non-motorized	
Number of daily trips (per capita), unsystematic	1–5	to 10	more than 10	
Access to basic services (bakeries, public transport, health facilities)	in the range of 300 m	in the range of 2 km	more than 2 km	
Accessibility to educational institutions (schoolchildren, students)	by foot, bicycle	public transport	private transport	
Enterprises				
Enterprises (sectoral)	mainly service sector	balanced industrial and service sector	mainly industrial sector	
Enterprises R&D	1–5	6–9	≥ 10	
SMEs and large enterprises	mainly SMEs	balanced SMEs and large enterprises	mainly large enterprises	
Environment				
Noise exposure	55–64 dB	65–74 dB	≥75 dB	
Environmental protection (opinion)	good	average	satisfactory	
Preference for eco-products	my preferen	high costs	occasionally available, diverse habits	I don't trust them
QOL				
Subjective perception of poverty (local environment)	high	moderate	low	
Subjective perception of safety (local environment)	completely safe environment	stable environment	lower safety	

Table 4: City performance indicators – qualitative; descriptive
Source: KWIK Surveys Questionnaire (2011).

5.6 Data structure and categorization

In the cities Maribor, Pleven, Linz, Erfurt, Trieste, and Brugge, a survey (By planning the survey, the recommendations of the sample survey approach were followed (see Tominc 2006, p. 10)), based on a questionnaire implementing method CAWI (Computer Assisted Web Interviewing employing application KWIK Surveys (SOZ 2011)) was carried out. The size of a representative sample was calculated by using standard deviation of the observed variable for statistical population, which can be determined from previous studies and on predicted confidence interval base (Bastič 2006). Standard deviation's (σ) value for the studied variable in the statistical population is 3.607, error probability is 0.5; value of the variable t at $t_{0,05}$ is 1.96.

Calculation of the sample size n was the following:

$\sqrt{}_n = 1.96*3.607/0,5$; $n = 199.92$, $n = 200$, respectively. Sampling was conducted according to the principle of non-random quota sampling, judgement sampling and partly also at random using a social network.

In $n = 200$, we obtained 184 correctly completed questionnaires, representing the sampling fraction:

$$p = (184/200 = 0.92);\ \text{SE (standard error of estimate)} = (\sqrt{0.92\ (1\text{-}0.92)\ /200})*100 = 1.9. \quad (2)$$

Considering the error probability, *z*-value (standard score *z* at the selected error probability) was calculated:

$$\alpha = 1\text{-}0.95 = 0.05;\ \alpha/2 = 0.025;\ z_{\alpha/2} = z_{0,975} = 1.96. \quad (3)$$

At the standard error of estimate SE (without correction factor) of 1.9 percent, lower confidence limit was determined:

$$8\% - 1.96*1.9\% = 2.4. \quad (4)$$

The questionnaire consisted of 20 closed questions, to which respondents (aged 20 to over 60 years, wherein this range didn't predefine the target group) replied with a choice between anticipated, mutually exclusive answers. In a single case dichotomous question (of two completely opposite directions type, i.e. male, female) had been used, a selection of multiple answers was not admissible. By using the Likert scale, respondents expressed their level of agreement/disagreement with a rank of viewpoints, semantic differential was not included.

Interpretation of the survey results

On the survey sample (n = 200) it was measured that at the indicator *the perception of poverty, 66.7* percent of respondents assigned most votes to the *alternative b) moderate*. If the results are induced to the population, in accordance to the sample size, we will be able to predict with 95 percent probability that between 60.1 and 73.3 percent of population believe in the existence of moderate perception of poverty. The aim of the survey does not represent a projection of the results to the entire population in particular cities, but a creation of the database for setting up a DEXi decision model (a "case study" of qualitative database's processing possibilities using artificial intelligence decision-making methods). In the qualitative research it is necessary to consider the limitations of subjectivity and perception; the results are yield of the respondents' answers (subjective, reflecting their self-image, which is not inevitably consistent with objective indicators), attention must be drawn also to the social desirability of responses (overvalued shares).

5.7 Multi-attribute decision – making using program DEXi

With an established system of descriptive city performance development indicators the study wants to enable qualitative decision-making in a systematic way by using a multi-attribute model in complex situations with a large number of factors and variables. By Grünig and Kühn (2005, p. 7), problem solving can be done in several ways: intuitively, routinely – by adopting formerly employed procedures or by random selection and systematic rational thinking, supported by relevant information. The general approach of the decision analysis originates from the axioms of the game theory by John von Neumann and Oskar Morgenstern (1953). Its main steps represent: problem structuring, estimating the likelihood of possible outcomes, determining their utility and evaluating alternatives as well as selecting strategies (Belton & Stewart 2002, p. 6; Čančer & Mulej 2005; Čančer 2007).

In this study, we conclude to use DEXi (Decision Expert) multi-attribute decision method, developed at the Jožef Stefan Institute (on the methodology DECKMAK or DECisionMAKing), which includes a result analysis of the evaluated variants (Bohanec & Rajkovič 1990, p. 145–157, Bohanec & Rajkovič 1995, p. 427–438, Špendl, Rajkovič & Bohanec 1996, p. 3). DEXi uses discrete and qualitative criteria, whose values are in general words, such as: good, excellent, unacceptable, unlike AHP – analytic hierarchy process as a numerical method, which for determining the importance of the criteria uses weights (e.g. the **Saaty Rating** Scale (1990)). Like AHP, the DEXi method is based on the decomposition of the decision problem to the hierarchical structure of criteria, where instead of words, intervals of numerical values can be used. The difference is noticeable also at the lower – level criteria aggregation functions into the final assessment, where the program instead of weights uses decision rules of "if-then" type. DEXi allows evaluation of variants also in the case of their incomplete and inaccurate information (Bohanec 2011).

In the first phase of the study, we identified the criteria, hierarchically reordered in a tree of attributes for building the decision model. Following this purpose, for each attribute (basic and aggregate) description and scale values were determined. Basic criteria represent the perception of the local community, local mobility, enterprises, environment, and QOL ("Quality of Life").

Area 1: Indicator: *satisfaction with the local community*. An important component of a sustainable society characterizes general welfare of its members or living in conditions, which include safe and affordable housing, the availability of basic services (schools, health, etc.), interesting and satisfying work, as well as opportunities to participate in local planning and decision-making. For this indicator there aren't any validated goals, only a general recognition that the welfare of citizens and their satisfaction with the local community are important elements of sustainability (European Commision 2002, p. 1–3).

Indicator *public transport (accessibility),* adopted from the models of sustainable urban development, is related to accessibility, availability of transport/transportation, social connectivity, access to motor vehicles and travel perceptions. Integrated accessibility is defined as the spatial distribution of potential destinations, as well as the quality and characteristics of the involved activities (Zahavi et al. 1981; Handy & Niemeier 1997). According to Wegener et al. (2000) accessibility is defined as a construct of two functions, one representing the activities and opportunities, respectively, and the other representing effort, time, distance or the costs of achieving them:

$$\$_L = \sum_M J(:_M).I(F_{LM}), \tag{5}$$

where A_i represents the accessibility of the area *i*, W_j activity *W* on the area *j* and c_{ij} the cost of reaching the area *j* from the area *i*. Functions $g(W_j)$ and $f(c_{ij})$ are defined as activity functions.

Among the indicators of area 1 the study also included: *social and health services*, *accommodation options and accessibility, as well as employment opportunities*. Their selection was based on the Eurobarometer Survey "Perception survey on quality of life in European cities 2009" (Eurobarometer 2009), which indicated significant variations in the level of satisfaction with health services between EU cities; 80 percent majority at the possibility "moderate" or "very satisfied" was noticed for residents of western European cities, while the level of satisfaction in many southern and eastern European cities was significantly lower (Eurobarometer 2009, p. 4). Considering the methodologies of Eurobarometer survey and the Urban Audit Perception Survey (Urban Audit 2004, p. 4–5) indicators *accommodation options and accessibility,* as well as *employment opportunities* were selected for our study. The results of the stated surveys show a pessimistic view on the labor market, with the expected inverse relationship between the availability of jobs and the availability of accommodation options.

Area 2: *local mobility* indicators include: 1) *systematic displacements* (home – school and home – work), 2) *the number of daily trips (per capita), unsystematic,* 3) *access to basic services* (bakeries, schools, public transport, health facilities), and 4) *the accessibility to educational institutions*. The set of indicators derives from theoretical principles of European Common Indicators (ECI), where the indicators of local mobility and transport include the percentage of trips by private motorized transport. Systematic trips (per capita) represent daily displacements to work/school and back, while unsystematic trips are made for other reasons, e.g. shopping, recreation and others. Model of citizens local mobility in the urban context is important in terms of quality of life (promoting alternative modes of transport; public transport, cycling). *Access to basic services* (bakeries, schools, public transport, health facilities) in sustainable community is vital for the quality of life and performance of the local economy.

The selection of the indicator is based on the headline indicator *availability of public open areas and services (see ECI).* Accessibility is defined as a percentage of people living within 300 meters of a public open area or other basic services and collective transport routes that, at least for part of a normal business day, have a minimum frequency (half-hourly service); public school (compulsory education); bakery, greengrocery, and primary public health services. European Environment Agency, Directorate-General for Regional Policy and ISTAT **(Istituto nazionale di statistica** – Italian National Bureau of Statistics) apply the concept "within 15 minutes by foot" for determining the accessibility. Absence of stores, selling fresh fruits and vegetables is an indicator of social exclusion and health risk (European Commission 2002, p. 15–18). Methodological principles of the indicator *accessibility to educational institutions* are also found in the context of ECI indicators, where the headline indicator of the area "children's journeys to and from school" represents the percentage of children going to school by car. The value of the attribute in the study refers to the modes of transport, used for children's journey to and from school (public and private transport), including also the possibility "walk, bike" (European Commission 2002, p. 25). A sustainable society is namely the one, which in terms of the traffic safety and crime seems safe enough to parents to allow the children street walking, cycling and using public transport.

Indicators of the area 3 (enterprises) are represented by: enterprises (sectoral), enterprises R&D, followed by SMEs (small and medium-sized enterprises) and large enterprises. The selection of indicators is based on the study "The Economic Map of Urban Europe" (Laakso & Kostiainen, 2007, p. 12–15), which in the context of the city's economic structure emphasizes the importance of service and manufacturing sector. The results of the study show specialization of the service sector (concentration of administrative functions), which in some capitals (e.g. Vienna) includes the dominant share of employment. In other capitals (e.g. Barcelona) markedly closer balance between service and manufacturing sector was noticed (Laakso & Kostiainen, 2007, p. 12). Production in the European Union on average employs 25 percent of the workforce, despite the de-industrialization plays an important role in the economy of many European urban regions. Industrialized European cities are seldom cities in economic decline, on the contrary, some of them are among the most dynamic and economically robust ones in Europe (Laakso & Kostiainen, 2007, p. 14). Considering the importance of both, the service and manufacturing sector, in the formation of decision rules for cities the equilibrium principle (balanced service sector and industry) is preferred in our study.

The selection of *indicators SMEs and large enterprises,* as well as *enterprises R&D* is argumented on the basis of the ECORYS (2012) research and the Eurostat database (2013). The results of the research show that despite the crisis in the euro area and the strained economic situation, small and medium-sized enterprises (SMEs) in the EU represent an important role in the Union's economy. According to the 2012 data, 20.7 million of SMEs contributed to 67 percent of total employment and 58 percent of total gross value added (ECORYS 2012). "Small Business Act – SBA" for Europe (newer version from 2011) recognizes the importance of the SMEs' role in the EU economy with the aim of striving to strengthen it in terms of reducing the administrative barriers, accessing new markets, ensuring free competition, promoting R&D, and supporting SMEs in regional and environmental context of the Europe 2020 key objectives – smart, sustainable and inclusive growth. Many SMEs are faced with so-called "non-recruitment growth" (or "jobless growth"), but the dynamic, despite the delicate economic environment, demonstrates increased enterprise (EU) activity in the "high-tech and knowledge-based industries and services". According to the EU-27 area's Eurostat data almost balanced contribution of micro and SMEs as well as large enterprises to the added value can be seen in average. Considering the above starting-points regarding the role of SMEs and large companies and their added value, the decision rules (*indicator SMEs and large companies*) in our study are related to their balanced distribution in the urban environment of medium-sized cities. The importance of high technology sector and knowledge based services leads to a preference for a higher number of R&D enterprises in selected urban areas.

Area 4 relates to the environment and includes indicators: 1) exposure to noise, 2) environmental protection (opinion) and 3) preference for eco products. Selection results from the set of European common indicators, which cover the area of noise pollution (European Commission 2002, p. 33–36; Ambiente Italia 2003, p. 113–114), where the headline indicator represents the percentage of the population exposed to noise Lnight (at night) > 55 dB(A) (Abbreviation for DeciBels Adjusted, dB(A) is the noise power, calculated in dB.). On the quoted basis the indicator of noise exposure with scale values of 55–64 dB, 65–74 dB and ≥ 75 dB (noise level), which do not relate to a specific time of day (e.g. by day, by night) was used in the study. A sustainable society should combine urban functions such as housing, work and mobility without exposing residents to excessive noise. Selection of the indicator environmental protection (opinion) refers to the Urban Audit Perception Survey (Urban Audit 2004, 5), which in the context of the local perception of quality of life measurement (QOL) in 31 European cities uses indicator of a "clean city". Interestingly, between cities, where most of the population believes that the city is clean, the majority of the population feels also completely safe. The baseline of the indicator preference for eco products represent the European common indicators (Ambiente Italia 2003, p. 127–128) in the field of sustainability promoting products (the headline indicator "percentage of people buying sustainable products", respectively). The indicator includes eco-labeled products, organic products, energy-efficient products, FLO fair trade products (Fairtrade Labelling Organizations), and eco products (e.g. Blauer Engel/Germany, the Nordic Swan/Scandinavian countries and the EU-Ecolabel /European Union).

Indicators of area 5 – QOL ("Quality of Life") are represented by: a) *subjective perception of poverty (the local environment)* and b) *subjective perception of safety (the local environment)*. Indicator subjective perception of poverty is based on the Eurostat database (2011) indicator "population at risk of poverty or exclusion; NUTS2". Selection of the indicator *subjective perception of safety* refers to the Urban Audit Perception Survey (Urban Audit 2004, p. 5) about the local perception of quality of life (QOL) in European cities.

The decision model consists of 22 attributes (Figure 10), hereof 16 basic and 6 aggregate. In the next phase of our study an adequate value, which in DEXi consists of words or numerical intervals (Jereb, Bohanec & Rajkovič 2003, p. 17), is assigned to each attribute. The rule "if-then" is used by DEXi in the table rows, which represent the utility function or decision rules. By setting the first (representing the worst options' combination) and the latest rule (best value) using Function Editor and by setting appropriate weights, the program automatically calculates other values, which, if found as unacceptable, can still be properly edited.

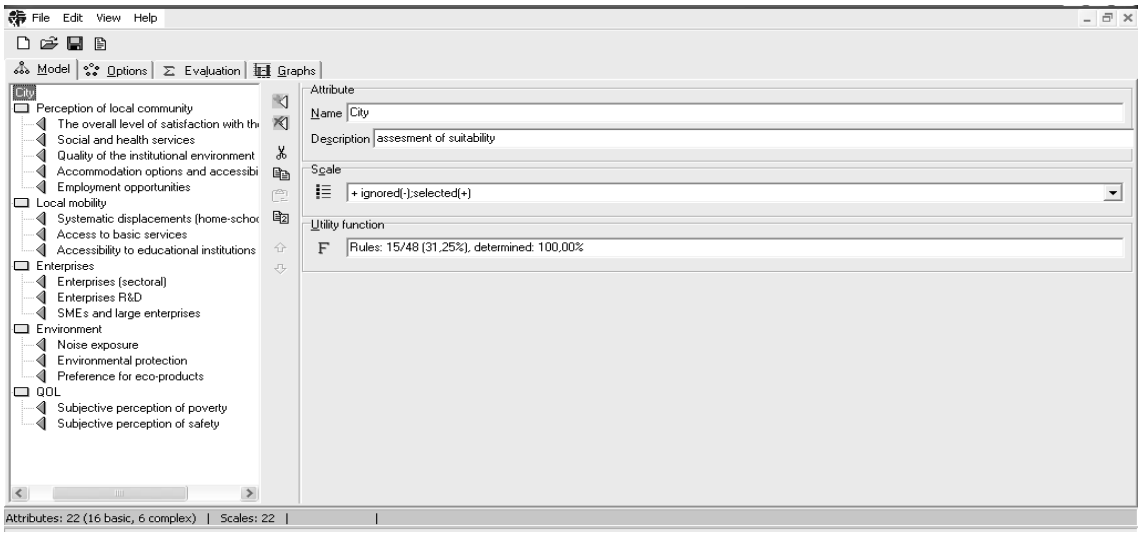

Figure 9: The model page of DEXi model window
Source: DEXi processing of collected data.

Interpretation of the decision rules for the attribute environment (Figure 11): in the case of noise exposure, greater than 75 dB, regardless of the scale value (represents any value) referring to the attributes environmental protection and preference for eco-products, the decision for the city selection is not taken. Decision rules are formed with reference to previously presented European Union environmental policy, wherein the headline indicator represents the percentage of the population exposed to night noise levels > 55 dB(A). Correspondingly still acceptable daily noise level up to 75 dB was considered in the study.

Decision rules	Noise exposure	Environmental protection	Preference for eco-products	Environment
	41%	36%	22%	
1	more than 75 dB	*	*	Ignored
2	<= 65-74 dB	satisfactorily	*	Ignored
3	<=65-74 dB	<=average	<=occasional available	Ignored
4	*	satisfactorily	<=high costs	Ignored
5	*	<=average	<=diverse habits	Ignored
6	*	*	<=I don't trust	Ignored
7	>=65-74 dB	>=average	>=high costs	***Selected***
8	>=65-74 dB	***Good***	>=diverse habits	***Selected***

Figure 10: Decision rules for attribute environment
Source: DEXi processing of collected data

Selection is confirmed in the case of the attribute scale value "65–74" (weight of 41 percent), environmental protection with a scale value "good" and preference for eco-products with a scale value "diverse habits". After entering attribute values (Figure 12) for *all options* (Maribor, Pleven, Linz, Erfurt, Trieste, Brugge), obtained by completed survey questionnaires (value selection is determined by the percentage majority), the study includes *evaluation of alternatives*. Option with the highest evaluation is generally the best, but the analysis based on the mutual comparison is essential because of reasonable, proven solutions given (Jereb, Bohanec & Rajkovič 2003, p. 14).

Option **City**	**Maribor**	**Pleven**	**Linz**	**Erfurt**	**Trieste**	**Brugge**
Perception of the local community	no	no	*selected*	i no	i no	no
The overall level of satisfaction with the local community	no	no	*selected*	o i	i no	*Selected*
Social and health services	o t o t ti i	ti i	*very satisfied*	*very satisfied*	o t ti i	*very satisfied*
Quality of institutional environment	pt	pt	*appropriate*	*appropriate*	*appropriate*	*appropriate*
Accommodation options and accessibility	o i	o i	*high*	o i	o i	*High*
Employment opportunities	i	i	i	i	i	i
Local mobility		*frequent*	*frequent*	o ion	o ion	*frequent*
Systematic displacements (home-school and home work)	*Selected*	*selected*	*selected*	*selected*	i no	*selected*
Access to basic services	*private transport*	p i t n po t	*private transport*	*private transport*	*private transport*	p i t n po t
Accessibility to educational institutions	*in the range of 300 m by foot, bicycle*	*in the range of 300 m by foot, bicycle*	*in the range of 300 m by foot, bicycle*	in t n o *by foot, bicycle*	in t n o p i t n po t	*in the range of 300 m by foot, bicycle*
Enterprises	no	*selected*	*selected*	*selected*	*selected*	i no
Enterprises (sectoral)	in i	*balanced industrial and service sector*	*balanced industrial and service sector*	in i	*balanced industrial and service sector*	*balanced industrial and service sector*
Enterprises R&D			*more than 10*	*more than 10*		
SMEs and large enterprises	in	*balanced SMEs and large enterprises*	*balanced SMEs and large enterprises*	in	*balanced SMEs and large enterprises*	in
Environment	no	*Selected*	*selected*	*selected*	*selected*	i no
Noise exposure		*55-64 dB*		*55-64 dB*		*55-64 dB*
Environmental protection			*good*	*Good*		
Preference for eco-products	tnt t	t i o t	*my preference*	i t	i to i	t
QOL	no	no	i no	no	i no	i no
Subjective perception of poverty	o t	o t	o	o t	o	o t
Subjective perception of safety	t n i no nt	t n i no nt	t n i no nt	t n i no nt	t n i no nt	t n i no nt

Figure 11: Options' evaluation results

Source: DEXi processing of collected data.

5.8 Results and their interpretation

Comparison of options (cities) Maribor (unselected) and Linz (selected) shows parallel values of both cities, namely: values according to weights and decision rules for Maribor illustrate moderate satisfaction with the local community, the acceptability of health services, solid quality of the institutional environment, predominantly services and SMEs, 65–74 dB of noise exposure, average environmental protection, distrust of eco-products, moderate subjective perception of poverty, and stable environment (median values, positioned neither in the critical nor in the selection interval).

Comparison of options

Attribute	Maribor	Linz
City	ignored	***selected***
Perception of local community	ignored	***selected***
The overall level of satisfaction with the local community	moderately satisfied	***very satisfied***
Social and health services	acceptable	***appropriate***
Quality of the institutional environment	solid	***high***
Accommodation options and accessibility	medium	
Employment opportunities	rare	***frequent***
Local mobility		***selected***
Systematic displacements (home - school and home - work)		***private transport***
Access to basic services		***in the range of 300 m***
Accessibility to educational institutions		***by foot, bicycle***
Enterprises	ignored	***selected***
Enterprises (sectoral)	mainly services	***balanced industrial and service sector***
Enterprises R&D	1-5	**≥10**
SMEs and large enterprises	mainly SMEs	***balanced SMEs and large enterprises***
Environment	ignored	***selected***
Noise exposure	65 –74 dB	
Environmental protection	average	***good***
Preference for eco-products	I don't trust them	***my preference***
QOL	ignored	
Subjective perception of poverty	moderate	low
Subjective perception af safety	stable environment	

Figure 12*:* Comparison of options Maribor-Linz
Source: DEXi processing of collected data.

Determinant values for city's non-selection include rare employment opportunities and the extremely small number (up to 5) of R&D enterprises (the importance of this weight amounts 47 percent), as non-selected also common combination of aggregate criteria values is characterized. Values, favorably affecting the choice, represent private transport within the systematic mobility (the latter is independent from the use of public transport), rapid access to basic services and the availability of educational institutions (proximity to schools). For the city of Linz all listed values express maximal selection influence (Figure 14).

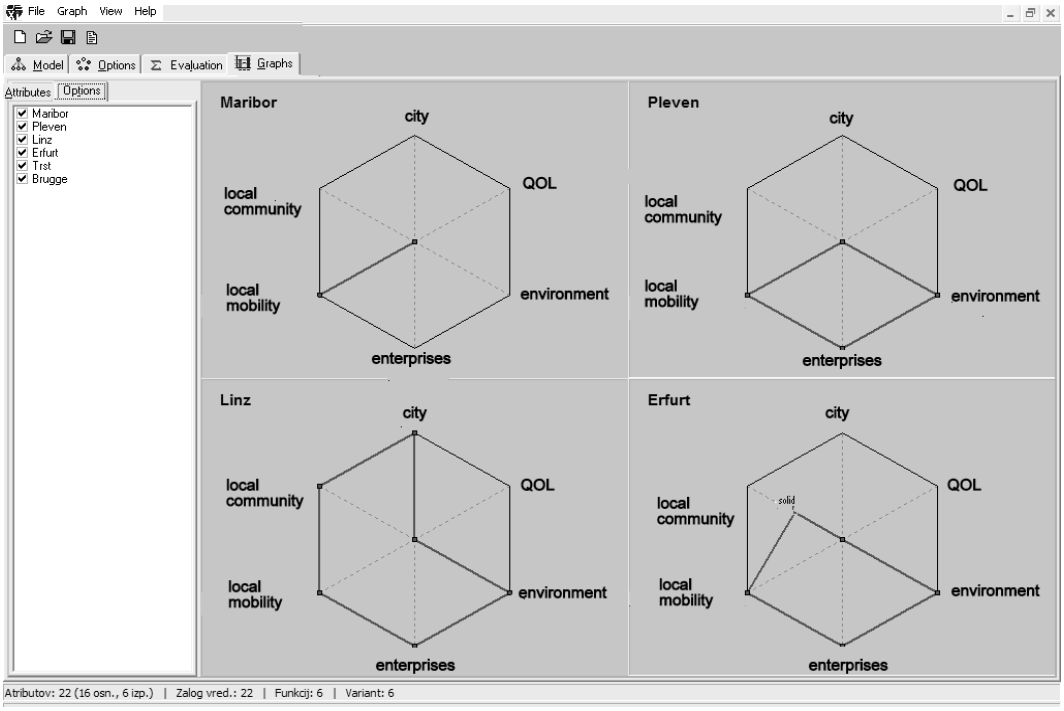

Figure 13: Radar chart (star plot) – comparison of options' (cities) attributes
Source: DEXi processing of collected data.

By the size of the star plot radarchart (Figure 14) and the pursuance of the weights, selection's decision criteria are met only by the city of Linz. Bottom option represents the city of Maribor with the best evaluation of the attribute local mobility. The evaluation results can be interpreted more clearly in a graphic form with a *star diagram*, taking into consideration the extent of the surface area (star) or criteria importance.

City of Erfurt is better than Pleven in the area of local community perception (solid), while the plot areas of Trieste and Brugge are identical (Figure 15), with the difference that Trieste is being better evaluated at the attributes enterprise and the environment and Brugge at the attributes local community perception and local mobility. Interesting is the area of QOL with the attributes subjective perception of poverty and safety under the assumption of strict selection's decision rules, namely; the option (city) is chosen only in the case of imperceptible poverty and stable environment or imperceptible poverty and completely safe environment (QOL expresses an important attribute of evaluation), whereby the decision rules of this attribute are not met by any city, included in our study.

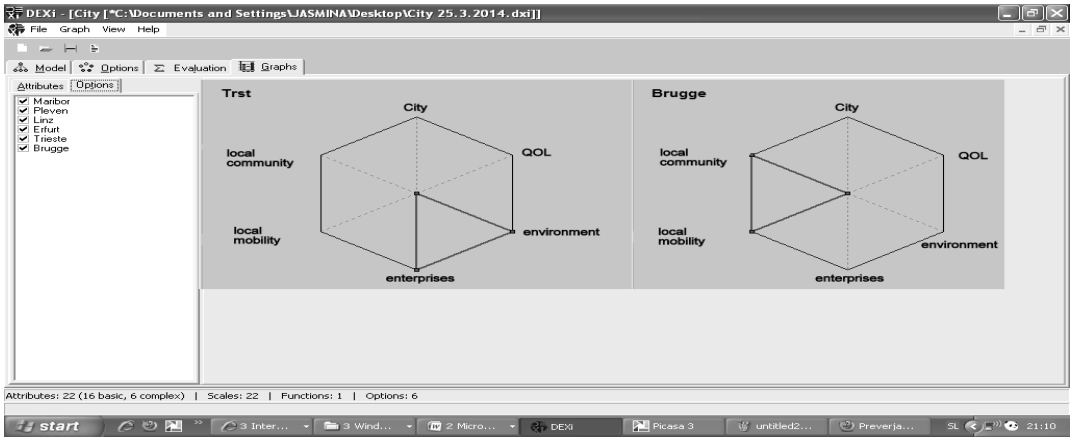

Figure 14*:* Radar chart (star plot) – comparison of options' (cities) attributes
Source: DEXi processing of collected data.

5.9 Conclusion

The purpose of our study is to compare the performance development of chosen European cities on the basis of the established set of qualitative indicators and the assistance of computer program for multiparameter decision-making processes, by using ECI methodology in national and international (European) comparable cities' sample, whose selection followed certain criteria. Determination of appropriate measurement indicators, closely related to the evaluation of well-known methodological concepts (ECI indicators, indicators of urban status and sustainability) and collected relevant databases (questionnaire, KWIK Survey) resulted in obtaining useful tool: an enlistment of selected descriptive indicators, reasonably divided into five areas and measurement categories, allowing selection of the most suitable option (city). By using multi-attribute decision-making and supporting software tool DEXi for qualitative data analysis, the decision model of the city selection consisted of 22 criteria, among them16 basic and 6 aggregate. Evaluation of options offered clarity in multi-criteria decision-making in accordance with the specified hierarchy and the importance of decision criteria (decision model, rules and option evaluation). Achieving the best possible decision often requires a trade-off between perfect modelling and usability of the model.

Meanwhile multi-criteria decision-making program DEXi allows verbal assessment (scale values: ignored, selected), it also offers a graphical user interface (the star diagrams – comparison of the options' attributes). It is reasonable to draw attention also to the trend of combining other methods. Namely, in addition to the use of DEXi, in the phase of decision making method's selection also programs as DEXiTree and Vredana can be employed. The latter uses mixed qualitative and quantitative evaluation, where to options beside qualitative also numerical assessment (numerical interval) is given, enabling them to differ even within a single qualitative value.

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6 Foreign direct investment and cities

"Globalization and free trade do spur economic growth, and they lead to lower prices on many goods." (Robert Reich)

Recommended additional reading:

- McFarland, K.C. & McConnell, J.K. (2011). Strategies for globally competitive cities. Local roles in Foreign direct investment and International Trade. Center for Research and Innovation. *National League of Cities, Washington, D.C. 20004*
- Mehta, P.S., in M. Dugal. (2003). *ABC of FDI. Monographs on Globalisation and India – Myths and Realities*. 3. CUTS Centre for International Trade, Economics & Environment.

6.1 Chapter Overview

International capital flows are important for economic development of cities. Foreign direct investments as one of the form of international capital flows bring a lot of benefits to the city. Studies that analyse effects of foreign direct investments on host cities show that they bring new skills in the city, generate direct and indirect employment, transfer technology and provide financial sources for local economic development. On the other side, foreign direct investments bring also some challenges for cities. They are most frequent in the form of fear or frustration for being unsuccessful by attracting foreign direct investments, a lot of cities have problems by changing policies to suit foreigners, very frequent threat from international capital flows is crowding out local entrepreneurs and businesses etc. During the period of increased volume of foreign direct investments a lot of cities developed and implemented their own strategy for attracting and supporting these processes. Such strategies seemed to be a very effective tool for maximizing the benefits and minimizing threats of foreign direct investments in cities.

Learning outcomes

By the end of this chapter successful students will be able to:

1. Define different forms of international capital flows
2. Understand effects of inward foreign direct investments on the host economy
3. Define factors that influence foreign direct investment flows
4. Define the most important steps for attracting and supporting foreign direct investments in the city.

6.2 FDI definition

Foreign direct investments (FDI) present one of the forms of international capital flows. Three mayor types of international capital flows are: FDI, foreign portfolio investment (FPI) and debt. The main characteristic of FDI and FPI is their stability and smaller proneness to reversals, while the main difference between them is that FPI lacks the element of lasting interest and control. FDI involve an equity stake of minimum 10%. Regarding benefits it is proved that FDI are more beneficial because of more direct control in management. Debt flows as a third form of international capital flows are bonds and bank loans and are more volatile.

UNCTAD (2013) defines FDI as investments that acquire long lasting interest in enterprises that operates outside of the country of the investor. FDI consist of reinvested earnings, equity capital and other capital (mainly intra-company loans). Also licensing, franchising, management contracts, product sharing, subcontracting, alliances, goodwill or grants named non-equity forms of investment can be FDI.

FDI can be classified in different forms regarding the type of classification. If classified on the base of entry modes of the foreign investor, FDI can be in the form of cross-border mergers and acquisitions (C-B M&As) or Greenfield investments. While Greenfield investments mean establishment of a wholly new operation in a foreign country, C-B M&As present takeover or merger with an existing local firm.

If classified from the recipient country view, FDI are classified as follows:

- Export-enhancing FDI, when FDI affects in transferring a new type of technology in order to increase host country export competitiveness.
- Import-substituting FDI, when FDI produce goods for the host country which is at that time imported from another country.

Classification from the point of investor view, categorize the following types of FDI:

- Horizontal FDI, when FDI produce the similar or the same product in the foreign country. The main goal is the exploitation of monopolistic advantages in the foreign country.
- Vertical FDI, when FDI acquire or build an operation that fulfils the role of a supplier or the role of a distributor. By the role of supplier, FDI seek to improve to the supply of certain key components or to the costs of raw material. By the role of distributor foreign investments are the response to the problem of finding distributors for a specific market.
- Conglomerate FDI include horizontal and vertical FDI.

By defining FDI, it is necessary also to distinguish between FDI net inflows and FDI net outflows. While the first ones present the value of inward direct investments made by non-resident investors in the reporting economy, the second ones present the value of outward direct investments made by the residents of the reporting economy to external economies (OECD 2013).

6.3 Development of FDI

Due to the differentiation in evaluating FDI then and now, the role of FDI in international capital transactions was much less notable before the First World War as it is today. The main difference is that the concept of FDI in that period did not differ from other forms of investments in foreign companies that come from the private sector (Lipsey 2001).

Although the First World War reduced international confidence and increased interventionism of national governments, FDI flows to overseas colonies increased because of high reconstruction costs and war debts. United States played the largest role as investor and the same happened also after the Second World War. After 1980 FDI increased even more because of the good general climate for FDI. The increase of FDI in the period from 1983 to 1989 was three times faster than global export growth and four times faster than global GDP growth (29% vs. 9.4% and 7.8% annually). The main factors influencing the increase of FDI were trade liberalisation and privatising and liberalizing of investments on national level (UNCTAD 1991 and Lipsey 1999).

In 2000, overall inward FDI recorded $1,300 billion but WTC attack in 2001 caused strong reduction of the volume of FDI. After 2003, FDI started to stabilise and in 2005 already recorded $982 billion. In 2007 (UNCTAD 2008, p. 3–9), worldwide FDI reached record levels of $1,970 billion but in 2008 the economic crisis interrupted the growth of international capital flows and the volume of global FDI reduced. After 2013, FDI flows started upward trend again and rose by 9 per cent to $1,450 billion. In the following Figure we are presenting inflows of FDI by groups of economies from 1995 to 2013.

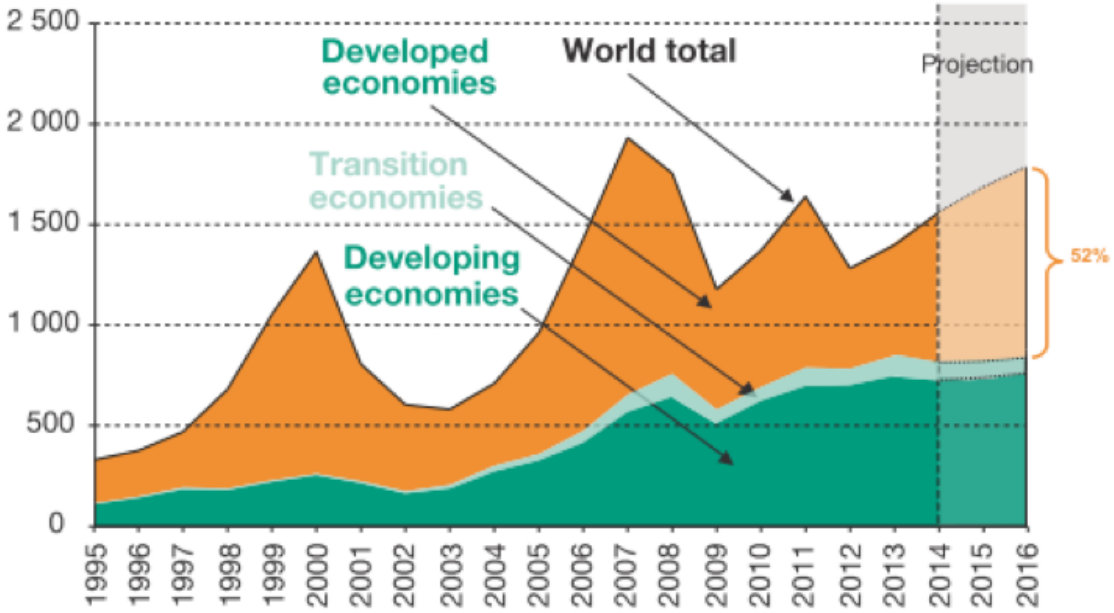

Figure 15: FDI inflows by groups of economies, 1995–2013
Source: UNCTAD, 2014.

In the Figure 1 it is shown that for a long period, the highest volume of worldwide FDI recorded developed countries, while in 2010 transition and developing economies together for the first time attracted more than half of global FDI flows. In 2013 FDI inflows increased in developed, transition and developing economies, while FDI flows to developing economies accounted 54 per cent of global inflows.

Regarding the structure of the FDI, most investments before World War II were in natural resources and infrastructure. Manufacturing investments became the predominant form of FDI in the post-war period. Nowadays, the most important sector for FDI are services. According to UNCTAD report (2014) the most important target industry is currently information technology and business services, followed by agriculture and tourism.

According to the Global cities of the future 2014/2015 report (Mullan 2014), Singapore is the most FDI's global city of the future, following by the London and Hong Kong. Analysis includes 130 locations. Singapore presents an attractive location for investors because of its economic potential and business friendliness. Between 2008 and 2013 Singapore recorded almost 2000 Greenfield FDI. London is ranked at the second place because of the human capital and connectivity categories. Foreigners invest in London mostly because of proximity to markets and customers. In 2013 London recorded 300 Greenfield FDI. These two cities can present good practice from which other cities can learn about things that are important for attracting FDI.

6.4 Why do companies invest in the foreign market?

The issue of FDI motives has crossed different streams of economic literature: theory of the firm, international business and international trade theory. The most famous and cited taxonomy of FDI motives is proposed by Dunning (1993). The economist John Dunning classified four primary motives foreign investors have when investing abroad. The taxonomy of motives is developed from the OLI paradigm (Dunning 1977). It includes three types of advantages: ownership, internationalization and location advantage. Ownership advantage explains why a company want to become a multinational, internationalization advantage explains how (in what way) a company want to enter foreign market and the location advantage explains the location where a company will probably invest. The taxonomy is created of the following categories (Dunning 1993, p. 59):

- ***Resource seeking***: foreign investor wants to acquire particular resources that are missing (raw materials or natural resources) or are more expensive (unskilled cheap labour) in the home country.
- ***Market seeking***: foreign investor is searching new buyers for their goods and services.
- ***Strategic asset seeking*:** foreign investors invest in foreign companies to help building strategic assets, for example distribution networks or new technology.
- ***Efficiency seeking***: foreign investors invest in foreign country because of a lower cost structure. They want to gain from different cultures, factor endowments, economic systems, institutional arrangements, market structures and policies and by intensifying production in a limited number of locations for supplying multiple markets.

6.5 Effects of FDI

FDI bring a lot of different effects to the host economy. Survey articles show inconclusive evidence in the literature regarding vertical and horizontal spillover effects of FDI. While some studies show positive effects of FDI on domestic companies, there are also some analysis proving neutral and also negative effects of these processes (some of the studies: Barro 1991; Aitken & Harrison 1999; Lipsey 2000; Liu et al. 2000; Gorg and Greenaway 2001; Baliamoune-Lutz 2004; Lipsey and Sjoholm 2004).

The earliest studies of FDI effects relate to FDI impact on firm's productivity. Caves (1974) concluded that effects of FDI on productivity in a domestic firm are positive. Also Blomström & Persson (1983), Nadiri (1991), Chuang & Lin (1999) and Driffield (2001) came to the same conclusion when analysing FDI effects on the productivity.

Another analyses of positive FDI effects in several studies showed that FDI transfer new knowledge and technology, develop economy potential, generate additional tax revenue for the state, reduce unemployment, support the strategies for development of individual sectors, develop management knowledge and increase engagement of local companies in supplier and subcontractor networks (some of the studies: Findlay 1978; Estrin et al. 1997; Xu 2000; Perez 2008 and Lin 2008).

Very frequent in the literature is also the analysis of how FDI affect economic growth. The results differ. While Blomström (1986), Mody & Wang (1997) and Lensink & Morrissey (2006) concluded that inward FDI positively affect economic growth in the host country, Haddad & Harrison (1993) and Smarzynska Javorcik (2004) concluded that FDI does not affect economic growth and Kawai (1994) and Mencinger (2004) even proved that FDI negatively affect economic growth.

FDI benefits are not self-evident and are different among countries. Lin (2008, p. 31) proved that FDI bring benefits if an investment environment is open and has active competition policies. Also democratic investment regime and trade, privatisation, deregulation and macroeconomic stability are very important factors by helping maximizing benefits of FDI. The distribution of FDI effects is depending on the business environment and economic policy regarding these processes in the host country as well as on other factors that affect their consequences. According to Reisen (1999) effects of FDI are positive with a time lag, while Cantwell (1989) and Perez (1998) believe that the positive effects of FDI depend on the sector in which the investment is entered.

On the other side, a lot of studies demonstrate negative effects of FDI. They often occur if conditions for FDI are unfavourable. Besides rising unemployment due to rationalization, uncompetitive behaviour of foreign owned companies, reduction of productivity of the host country, concentration increase in the domestic market (Kokko 2006; Aitken & Harrison 1999; Blonigen & Taylor 2000; Aslanoglu 2000; Haller 2005; UNCTAD 2007), closure of local firms, shrinking domestic stock market, low pricing for sold assets, pressure on current account and elimination of competition in the domestic market (Tsang & Hauck 2007; UNCTAD 2007, p. 123; Maček 2009; Maček & Ovin 2014) are the most important threats mentioned in the literature. However, in the last period minimizing the control in strategic industries and threatening the national autonomy and sovereignty appeared to be an important negative effect of FDI too (Lin 2008).

Mehta & Dugal (2003, p. 24–26) summarized effects of FDI that can regarding the conditions in the host country appear as a benefit or as a threat. For example FDI transfers technology and skills into the host country, but some countries cannot absorb high technology brought by foreign firms. FDI can improve market access of goods but if international capital flows enter the country only to exploit domestic markets, than there is no contribution to greater market access for domestic country exports. Although FDI often lead to increased employment in the host country, this is more often in well-developed urban sectors with high levels of education and infrastructure. In some cases FDI can improve the balance of payments, but on the other side through an increase in imports of inputs and through remittances of royalties and dividends abroad by the subsidiaries FDI could have also negative impact on the balance of payments of the host country. Effects of FDI depend on the form of international investment and mainly on the conditions for FDI in the host country.

When analysing benefits of FDI for cities, researchers often expose FDI as an important factor for economic development of cities. If summarized, the most frequent benefits of FDI for cities mentioned in the literature are the following:

- FDI bring new skills which can be later transferred to local workers and managers.
- FDI generate direct or indirect employment.
- FDI exchange technology, policy ideas and other forms of knowledge.
- FDI provide finance for economic development as international investments speed the construction of infrastructure, information systems and other basic conditions for development.
- With FDI city can improve human resources, marketing and other activities to strengthen the competitiveness of a city.

Generally, FDI helps to raise the profile of the cities. Local areas that have competed successfully for FDI in the past are highly attractive for more investment in the future.
On the other hand, the most common obstacles and challenges cities face regarding FDI are the following:

- Cities that are unsuccessful by attracting FDI can be frustrated.
- A lot of cities have problems by adopting policies for FDI (for example, policies to assist development at the urban periphery might contribute to transportation problems).
- FDI might push out local entrepreneurs and businesses.
- Foreign investors sometimes repatriate their profits to their own home countries instead of leaving them in the host city.
- The costs of offering incentives to foreign investors might lower the possible economic gains of investment.

As the main goal of each city and country is the maximization of benefits and minimization of costs of FDI the effective government regulation and friendly environment for investors is of high importance in ensuring effective utilisation of FDI.

Case Study 1: FDI in Singapore

In 1965 the city-state Singapore faced a lot of challenges, such as a lack of natural resources, small economic base and high unemployment. Today Singapore has one of the most open economies in the world. Openness is within the main reasons for rapid economic growth of this city. Since independence in 1965 Singapore has relied heavily on international trade and FDI for its economic development. During the period between 1965 and 1980 government introduced several steps to attract FDI. They developed one of the most liberal and open-trade regimes in the world, adapted national standards in the way that most industries are open to FDI and took concrete steps to protect intellectual property. They also prepared and implemented a strategic plan for creation of polytechnic schools and technological universities and made friendly environment for investors with investments in infrastructure (new roads, airports, and telecommunications).

From 1960 there was a significant increase of foreign share of GDP. FDI as a percent of GDP rose from 4.85 in 1970 to 21.4 in 2012. FDI in chemicals, petroleum, transportation equipment, electronic equipment and other manufacturing areas helped by developing those industries. From an economy that was primarily involved in manufacturing consumer goods in labor-intensive industries in the 1960s, Singapore moved to one that produces high value-added goods and a variety of complex services in the 2000s. Investment policies supported high-value added industries as well as targeted cluster activities, including those in logistics, research and development and biomedical sciences. In 2013 the values of FDI in Singapore recorded $848.9 billion. The main investor countries in Singapore were United States, Netherlands, Japan, British Virgin Islands and United Kingdom (Hsu 2012; Mullan 2014).

Case study 2: FDI in London

London is ranked on the top of European destination for FDI. The most FDI London attracts in the business services, financial intermediation, software sectors, security broking, insurance and pension. According to data from Greenfield investment monitor fDi Markets London recorded 300 Greenfield investments in 2013. Within Europe London led the ranking, ahead of Paris with 115 projects, Dublin with 89 and Moscow with 85.

London is known as a city that has an investor friendly policy. The government has established London Development Agency for providing all the necessary information and support to investors. This agency promotes foreign investments in the city in the form of several programmes. The agency is important by taking London towards a path of sustainable development and contributes to the development of the skills of the local people. Furthermore, London has also other agencies such as 'Think London' which was established for the promotion of London as a city for investments and for assisting investors with the complete important infrastructure for developing a business in the city.

If analysing the whole Europe the most popular sectors for inward FDI in 2013 were IT services and software, business services, textiles and financial services. Software and IT services created an estimated 14,829 jobs in 2013, while automotive components created 14,743 jobs and consumer products created 9,969 jobs. The most active investors in Europe in 2013 were from the Germany, US and the UK (Kaczmarski 2014).

6.6 Factors influencing FDI flows

In the literature factors, such as political risk, infrastructure, investment environment, judicial transparency, red tape, bureaucratic hurdles, regulatory framework and the magnitude and complexity of corruption in the host country are often mentioned as factors that influence international capital flows (Mottaleb 2007, p. 4). Also the availability of skilled labour, the country risk rating, the host country size (Nonnemberg & de Mendonça, 2004, p. 2), labour costs and the market openness (Taylor & Francis Group, 2004) are important factors that influence inward FDI flows. Chen (1996) and Bevan & Saul (2000) highlight also gravity factors, transport infrastructure and development and research capacity in the host country as important factors that influence on FDI flows.

In World Investment Report (UNCTAD 1998, p. 91) there is a list of factors that influence FDI flows classified as follows:

- factors related to natural resource extraction, new markets acquiring and greater efficiency named as microeconomic factors,
- political and economic factors meaning international FDI agreements, privatisation policy, the trade and fiscal policy and
- factors related to FDI promotion, location attractiveness, incentives for investments and other factors that are related to business facilitation.

Within them microeconomic factors are the most important while successful cities widely use incentives for attracting investment. With incentives policymakers stimulate investments in specific industries, activities or disadvantaged regions. The most common definition of incentives is that they presents non-market benefits used to influence the behaviour of investors. Incentives can be given in many different forms from national, regional and local governments. Different forms of incentives can be classified in three basic categories regarding benefits they offered: regulatory benefits, fiscal benefits and financial benefits. According to the UNCTAD report (2014) the most important type within incentives are fiscal incentives, while regulatory and financial incentives are less important policy tools for attracting FDI.

Blomstrom & Kokko (2006, p. 22) highlighted general country's industrial policy is the main determinant for attracting FDI and maximizing their benefits. A lot of countries and especially cities within them developed their own strategy for gaining the most positive effects of international capital flows. The main components of such strategies are presented below.

6.7 A City strategy for attracting FDI

Cities play an important role by attracting FDI. As already written FDI inflows depends on many different factors, but practice show that city can strong influence on the effects of international investments. The most important things are that they attract the appropriate investments and offer the conditions in which investment gives the most positive effects. When locating the business, investors seek the following:

- a stable regulatory and macro-economic environment,
- natural factors, such as climate, geography and endowment of natural resources,
- market access and open competition,
- human factors such as skilled labour,
- manageable regulation and taxation system,
- social factors such as infrastructure of each locality and a good quality of life.

By answering the question "How to become an attractive destination for investors" the most successful cities developed and implemented their own model or strategy for attracting and supporting FDI. McFarland & McConnel (2011, p. 9–15) define the following 5 steps, which help cities to attract and support FDI.

Figure 16: Strategy for attracting and supporting FDI in the cities
Source: McFarland & McConnel (2011, p. 9–15).

1. Identification of cities' Assets and Key Sectors

In the first step city should make an analysis of its strengths and weaknesses. An analysis should include also city's access to technology, workforce skills, quality of life and physical infrastructure. As local and regional assets are very important for FDI attraction, cities should accelerate already existing assets and provide clear specification for the types of businesses or industries it can support.

The most effective way is that city focus on its own location and competitive advantages. City should focus on business and industries whose strategic needs match local assets, that have a tendency to invest in foreign capacity and in which the city has distinct strengths in the sector compared with other places competing for investment. The result of this step should be the list of the most important sectors. Important are also sectors that involve local actors as that signals that there is supporting infrastructure, workforce, technologies, services and suppliers for their industry. Foreign investors often favour to invest in the sectors that already have a strong local presence.

2. Creation of City Awareness

The second step city should do when preparing the strategy for FDI attraction is developing and promoting the awareness of cities assets. In achieving this goal most cities build their own image or brand, which helps them to raise the visibility of their strengths and opportunities. An image should have the goal to differentiate the city from others that compete for inward FDI.

Deep support among key partners and local and regional leaders is also important for foreign investors because local chambers, elected officials and regional organizations have influence on the success of a business or economic development project.

After developed image city should create the awareness of the image. This can easy be done with videos of city and print brochures presenting specific assets of interest, including a list of investment opportunities. An important way for city promotion is also a multilingual website of the city, which should be easy to use. It is important that the advantages of a city are communicated through different industry channels. Furthermore, city should contact firms targeted as potential investors directly with tailored information.

3. Identification of Investor leads

The main aim of third step is to generate greater quantity and quality of business leads in the city. Proactive lead generation is of importance by ensuring that investments are supporting the overall economic goals of the city.

For proactive lead generation a lot of cities have specific local strategies that rely especially on networking and relationship building. For better effectiveness of attracting FDI cities should be engaged in these activities for identification of leads and for ensuring that it is well-positioned when an investment opportunity appears. Specific local strategies contain:

- A list of experts from industry that help generating leads. They are important for maintaining and strengthening the existing networks and present the main base of knowledge when potential investors have questions;
- A plan for business networks with economic development organizations in foreign cities that have similar or complimentary industry targets. This is important for beneficial partnerships;
- Connection with state agencies and providing them with city's investment portfolio.

It's important to know that the most positive for host city are investments for which city have the right assets to meet investment needs.

4. Facilitate and Prepare

City should understand the business environment and prepare itself with supportive environment, resources and guidance to simplify the international business. Within this step it is advisable for city to build a city advisory committee with an aim that of providing resources and information quickly if an investment deal is appearing. The best is if committee is composed of people who can qualitative and quick answer technical questions about the city to the potential investors (bankers, real estate lawyers, environmental lawyers, regulators). Member of the committee should be fast responsive as this proves that the city is committed and serious.

City should also fulfil the investors' needs regarding strategically using resources, such as establishing a foreign trade zone, workforce training, clearing land or providing financial incentives. Having in mind that there are stages of the site-selection process it's necessary to understand what kind of incentives is beneficial for the investor at a particular moment. If other basic factors, for example, quality of life is of greater concern of investors an incentives package is irrelevant. Blomstrom & Kokko 2003, p. 22) suggest that incentives are focused on the activities with strongest potential for spillovers.

Foreign firms often search similar conditions for business as they have in their own country. Cities can help foreign investors by managing their expectations and understanding of the business requirements and environment in the city. Barriers such as language or different legal system can be overcome with offering translators, lawyers, accountants etc. The main goal of this step is that investors recognize the city as the one that they can count on.

5. Monitor and Provide Aftercare

The last important step is city awareness that the support and concentration to the foreign investment and firm should not end after the deal is secured. Activities within this step include evaluating the success of each investment. City should analyse for example: the number of jobs created, new or improved technology and other economic benefits foreign investment brought to the city.

Investors' aftercare is also important because it facilitates retention and the early and continued success of the investment, generates new leads more easily and quickly and continues to leverage the investment for economic growth. Aftercare provision usually includes continued support to the business, such as constant communication with the investor.

A city will have the greatest success by attracting investments in industries where it has a competitive advantage. Practice shows that FDI strategies succeed when the city has the ability to support investments and budget is appropriate. City should have well prepared marketing strategy and follow-up procedures. And the last, but very important thing is that people involved in attracting foreign investors are aware of cities' strengths and understand investment needs.

Case study 3: Best practice tools for attracting FDI in cities

Many successful cities attract inward foreign direct investment. For improving the flow of private investments in cities simplified administration, clarity in policy, contamination remediation, targeted private sector initiatives and clarity of procedures were found to be the most important. In the following table we are showing what tools selected cities have implemented in order to increase international capital flows.

City	Governance	Tools
Amsterdam	A voluntary public/private partnership named Amsterdam Economic Board promotes investment across 25 local and 2 regional councils. Official FDI agency is Amsterdam inbusiness.	Webpage includes presentation of information on key industries for investments and success stories of existing investors. (see: http://www.iamsterdam.com)
Barcelona	Council's Barcelona Activa is the IPA.	Webpage includes presentation of all necessary information for investors. (see: www.barcelonactiva.cat)
Birmingham	A public/private partnership named Marketing Birmingham is responsible for inward foreign investments.	Webpage includes information on case studies, events, 3D video on the economic zones and other important information for investors. (see: businessbirmingham.com)
Edinburgh	A public-private body named Marketing Edinburgh promotes city for investments.	Webpage includes invest map, Invest Edinburgh magazine, deals, blogs, development hotspots and other important information for investors. (see: http://www.investinedinburgh.com/)
Hamburg	HWF Hamburg Business Development Corporation is the city's joint public-private IPA.	Webpage presents introduction for establishing a business in the city and other important information for investors. (see: www.hamburg-economy.de)
Paris	Paris Développement is council's economic development agency acting as IPA.	Webpage presents projects and opportunities for investments in Paris. (see: www.investinparis.com/en)
Singapore	Attracting investors is part of the work of Contact Singapore, an alliance of the Singapore Economic Development Board and Ministry of Manpower.	Webpage offers information on business parks and presents online guide for potential investors. (http://www.contactsingapore.sg/investors_business_owners/)

Table 5: Strategies for attracting FDI in cities
Source: Waterfront Development Agency, 2014.

From the table it can be noticed that the prevailing governance structure is an integrated, enabling council-led Investment Promotion Agency (IPA) for the whole city or region and a public-private model for specific districts. The functions of the IPA usually include investor facilitation and servicing, image building and policy advocacy. To be effective, the IPA should have a high degree of political visibility, active private sector involvement, and operate in a good investment environment. The main tool cities use is one-stop shop (OSS) website with the main focus of FDI in key sectors and development zones. All presented cities also offer many incentives for investors. Normally incentives include tax holidays, policy reforms and infrastructure improvements.

6.8 Conclusion

Foreign direct investments present an important source of capital and are considered as an effective instrument for the distribution of know-how and skills in the global economy. Among the most frequent positive effects in the form of increasing of employment, technology and know-how transfer and rising productivity international investments can also improve management systems and transfer the best practices in accounting rules, corporate governance and legal traditions across borders. Although inward FDI has wider positive effects we should be aware also of threats that international capital flows can present for the cities. These are the most frequent in the form of frustration for being unsuccessful by attracting foreign direct investments, crowding out local entrepreneurs and businesses etc. With the goal of maximizing the benefits and minimizing the costs of foreign investments it is advisable that cities develop an own strategy for attracting and supporting foreign investments. In such a way city identify key assets and sectors with potential to invest, identify the investor leads, prepare the environment for investments and support the investors in many different ways. With the appropriate and favourable conditions for investments city can gain such benefits from investments that strongly contribute to economic development of the city.

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7 Innovations for sustainability

"To raise new questions, new possibilities, to regard old problems from a new angle, require creative imagination and marks real advance in science." (Albert Einstein)

Recommended additional reading:

- Smart City Reference Model: Assisting Planners to Conceptualize the Building of Smart City Innovation Ecosystems (Zygiaris, S.J. 2013, p. 4(2), 217–231).
- Will the real smart city please stand up? Intelligent, progressive or entrepreneurial City? (Hollands 2008, 12(3), 303–320).

7.1 Chapter overview

Understanding the concept of sustainable innovation is an urgent fundament to create development projects for community progress. Financing them is not such a big problem as it seems at first look if we have in mind that cooperation between as many different stakeholders as possible is the key for success. Every community has its own needs. It is not important if the community is organized as a small town or even village or if it is a big urban centre. Truth is that around 50% of population lives in big urban centres but there is a fact that the other half lives in smaller communities. Generally we cannot and may not talk about progress by forgetting the needs of that other half. The sustainable development is only possible if every sphere is developing equally.

Learning outcomes

Your goals for this "Innovations for sustainability" chapter are to learn about:

- the concept of sustainability,
- innovations – what they are and why are they so essential for social and economic development,
- different ways of financing innovations in public services,
- the basic concept of private investments in public infrastructure,
- the need of analogy between big cities and small communities.

7.2 Sustainability – A concept or just a fashion?

Man's attitude towards the environment has through thousands of years presented itself in exploitation of natural resources that have been inferior to the needs a human as the "absolute master with the right to an unlimited use and exploitation." (Pichler 1997, p. 1291)

In the last hundred and fifty years in which the human kind managed to achieve the biggest technologic progress in history it became evident that the uncontrolled desire for an economic expansion, without any respect for the consequences, endangered its own existence. The first recognition, that due to endangering our own kind it is necessary to protect the environment in which humans live was followed by implementation of rules, restrictions and later different regulations which (except a handful of people) not many thought of as significant. The second recognition, that a healthy environment is in fact a foundation for a healthy life resulted in the beginning of the development of the Environmental Law.

In spite of the environment protection with the help of the numerous national and international legal norms the uncontrolled industrialization and urbanization caused an enormous damage to the environment that consequently resulted in emergence of eco-remediations that could be defined, not only as environment protection but also as systems for regeneration of the environment, which take into consideration the meaning, structure and functioning of ecosystems. In the second half of the previous century most of the modern countries added the environmental care in their directives of the " economic and social development" as a responsibility towards the global community.

The fact that the uncontrolled use and exploitation of the natural resources caused not only thinning of the ozone layer, the green house effect, animal and plant species extinction etc., but also a lack of natural resources had in our opinion been the reason for growing tendencies for replacement of non-recyclable natural resources with the recyclable or limited with the unlimited, with which we could ensure a permanent use of natural resources.

Brundland (1987, UN report Our common future)) has in her report popularized the term 'Sustainable development' and made its definition that has since then been, in addition to the World Bank, used in numerous governments and international documents. She believed that a sustainable development means satisfying the needs of today without jeopardizing the future generations in fulfilment of their needs. Surely, sustainable development is by no means only the use of natural resources. In the same report Desai illustrated the sustainable development by using an image of a bridge connecting economy, ecology and ethics and emphasised that is necessary to link different sectors (agriculture, energy, commerce, investments) and integrate the sectors into the development planning. He also points out that it is necessary to expand the concept of the sustainable development onto all sector policies and the most important: onto the key private sphere stake-holders.

The very report meant a turning point in perception of development policies and the term " economic and social development" that had often been used before got replaced by the term "Sustainable Development".

Lukman (2009, p. 82) claims that a "sustainable development emphasises the evolution of society with a responsible economic acting that is in accordance with environmental and natural processes. The political dimension for him represents the key element to it. In the sustainable development the paradigm of the economic, social and environmental resources limitations with intent to contribute to the welfare of the future generations is contained. It can be applied on a local, national or global level; anywhere it always bases on political decisions."

The role of the politics lies within the development guidelines of any field whatsoever may it be the economic, social or environmental and is important indeed. However we believe that without an efficient cooperation (vertical as well as horizontal) of all stakeholders, politics cannot fulfil its basic task which is to achieve those sustainable goals towards which the development of the society has to be oriented towards in order to ensure its present as well as the future welfare.

According to Sharachchandra (1991, p. 607–621) the term Sustainable Development is merely a phrase, that not only does not offer a satisfactory definition but even more, it demonstrates the lack of an actual content in interpretations of the concept and an inability to form a picture of an efficient model of a sustainable institution.

We, his critics can give our consent since it is impossible to trace the unified definition of the sustainable development in theory and it is usually linked with the context in which it is used in EU's documents where we can also find the term "the sustainable growth" and an interpretation that bases on Brundland's report when explaining the term. And if the report on our joint future has in fact set a frame for a definition, it has within that left a vast space for different interpretations. This on its own is, of course, not bad. The problem however is, and we should agree with Sharachchandra on this one as well, that with the popularization of the term came also an uncontrolled phraseology. "Sustainable, sustaining etc." became adjectives that often simply get patched on to numerous different terms only because it is more likeable.

The logical consequence of such examples is that it is difficult indeed to extract the content out of such expressions. In case there was an efficient model of executing a sustainable activity, such and other similar nebulousness could be avoided but now even though a well designed frame of a definition of sustainable development, as a consequence of the stated above, creates a (false) impression that the sustainable development is nothing but a phrase.

A similar opinion was also expressed by Temple (1992, p. 1) when he wrote that the term "Sustainable" is overdosed and that "the word 'sustainable' is these days used in far too many instances and ecologic stability is one of the instances that is confusing for numerous people. You have heard about the sustainable development, the sustainable growth, the sustainable economies, the sustainable societies and the sustainable agriculture. Everything is sustainable."

Not considering the critiques, the problems of sustainable development has been from year to year becoming more enforced.

In the year 1992, within the frame of the Conference of the United Nations RIO+10, on the basis of the Brundald's report a discussion had been opened on development projects and adopted an important document named Agenda 21. As a conclusion document the Agenda has defined the key environmental problems as well as the necessary measures and references for reaching a sustainable development. Important guidelines were given in the Agenda's part where it recommends transferring the executing principles and producing concrete plans for a sustainable development onto the lower political spheres which means from the international onto the national and hence from onto the local level.

Agenda 21 has referenced redefining and encouraging the institutional changes that have according to Write (2004, p. 761–768) an essential role in achieving the sustainable development. The role of the local communities is in this respect particularly important. Developing individual sustainable goals oriented on specific needs or tasks of a specific local community including all the stakeholders (public administration, economies, public sector, civil society, inhabitants) on the basic development areas (economic, social and environmental) brings benefits to the community as well as to the inhabitants. At the same time it represents an "important demonstration of the ways necessary to achieve the wanted values and performance within the whole community." (Cortese 2003, p. 15–22)

The World Forum 2005 has placed the strategy of the sustainable development in three pillars that support each other:

- the economic development
- the social development
- protecting the environment.

According to some United Nations' Forums we should in the lines of the general declaration on cultural diversity also have the fourth pillar, represented by the cultural diversity.

Protection of natural resources is embedded in all the spheres of the sustainable development and represents an efficient use of energy (heating, cooling, lighting), environment protection and eco-remediation (managing the agricultural, forest land, building plots, water systems, litter, air), the use of the green technologies (broad-range connections and internet services, roads, public transport, railways) as well as the care for healthy food and a reasonable planning and executing the plans for the non-economic activities as are health-care and education. In doing so, a concern for the environment and a responsible use of natural resources also have to be a part of the strategy of economic development. In addition to a consistent concern for the environment the economic development has to focus on all members of the community and not just on a few.

According to Schoeman (2013) when social development is concerned there is a distinctive problem within the poor communities that are for the most part overlooked in the big development plans, which needs to be overcome in striving to achieve a real sustainable development. The indicators of the sustainable social development are mainly the length of life-time, education and GDP per person.

From the three pillars of sustainable development it is evident that the development applies on the environment as well as on the economy and social strata of people. In case it is executed on all three levels at the same time, then we can actually talk about a real development. The imbalance of the spheres or simply a "development" that is profit oriented cannot be marked as a sustainable one.

The United Nation's conference RIO+20 in 2012 has for many been a disappointment. Considering the fact that it has been 25 years since the Brundland's report was published and 20 years since the first world forum (where the Agenda 21 was accepted) happened, there has been, with the exception of numerous polemics, meetings and conferences, done very little. As the main reason, too big expectations from the national and the intergovernmental administrations without cooperation, public rising of awareness, educating the general public and those active in the field of economy was pointed out. (Halle, Najam and Beaton 2013, p. 1–14)

EU has in its contribution for the conference singled out that in spite of efforts from the sides of government and non-government organizations in all the Countries sustainable development still is not a priority on political agendas, also that the goals are still not specifically defined and that there is simply not enough cooperation between ministries in governments. To be able to annulate the gap in practice it is important to stimulate wholesome strategies, public interest, raising awareness and efficient administration. Above all however, it is urgent to start imputing new mechanisms of coordination and establish an active cooperation among all involved: the government and the non-government organizations, local authorities, civil society and the private sector. The cooperation between the public and the private sector in transition to a sustainable development is crucial for EU.

The sustainable consciousness has to be introduced to all organizational structures; it needs to become a part of the research, development and innovativeness, teaching, learning and expert work, as well as, all the activities have to be carried out in graduate baby steps and goals. In addition to this, it is necessary to firstly focus on the local level and spread the new realisations horizontally and only then spread them vertically.

Due to the definitions quoted that are in fact more or less politically prejudiced, the formal specification of sustainable development from the point of view of the Theory of Systems or the Theory of Systems Management is indeed extremely demanding. Both disciplines have been developing since the 1960s. (Hasegawa 2013, p. 1–7)

Let us abstract the sustainable development as a management system (P) that has a multitude of outputs (y) in time (t). Those outputs define the economical, social and environmental indicators. The sensor (F) enables the detection of the selected indicators. According to the soft definition it should detect the economic statistics, public opinion surveys as well as the results of measurements of environmental physical quantities. The measured differences (e) among the desirable values (r) and the measured output values (y) are then brought into the controller (C). The later has to generate such inputs (u) that draw the output values towards the desired values (r).

The controller in such a context has to react on both levels, on the legislation level as well as on the monitoring and undertaking compulsory measures (e.g. financial, tax, environmental control). Unforeseen disturbances (i) from the system surroundings influence the mirroring of the inputs (u) onto the outputs (y). The principle of system management leaning towards graduate reductions of the difference (e) between the wanted condition (r) and the actual condition (y) is in theory of management called the principle of the management system with a negative loopback (Figure 17).

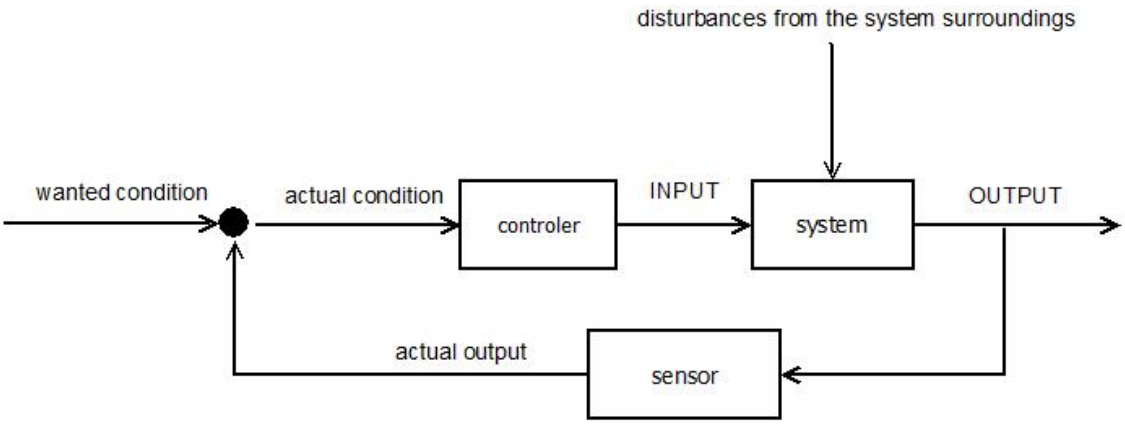

Figure 17: Principle of the management system with a negative loopback
Source: Own, 2014

Such a weakly defined system of sustainable development is practically uncontrollable, unobservable and consequently instable. Some brilliant scientists such as Piere-Simon Laplace (Z-transformations, Theory of Probability), Aleksander Lyapunov (Theory of Stability), Norbert Wiener (Cybernetics), Harry Nykvist (Criteria of stability), Richard Bellman (dynamic programming), Andrej Kolmogorov (Wiener-Kolmogorov's filter), Kalman (Kalman's filter), Lev Pontrjagin (maximum and bang-bang principles) have been working on solving these problems.

The very concept of stability could be used as an analogy for sustainable development. Let us enumerate only the most important obstacles for management system with a negative loopback:

- measuring of the output of variables: a) there is no consensus on recruitment of the output variables and b) different delays in taking the measurements (e.g. from milliseconds in environmental measurements to several months in opinion surveys and economy statistics) and c) a sensor has to measure multiple variables simultaneously since it is the so called MIMO system in question (multiple inputs, multiple outputs),
- a dynamic setting of the desired values: in addition to the emergence of new indicators (and letting go of the old ones) the set point values of the outputs change with time,
- Building a robust and at the same time responsive and in addition to that also a precise controller would demand a lot of cooperation and efforts from different participants (from science to economy, law, organizing via concise legislation and an efficient inter-sector control as well as efficient implication of sanctions.

Evethough, the realisation of the concepts of the Theory of Management into a sustainable development seems in the present to be a distant future, there are however essential conditions such as cooperation and expert knowledge of the participants (civil society, entrepreneurs, different fields' experts, legislators) that have to be met first.

The effect of raising of awareness and educating brings stronger and better results than the passing of a new legislations, declarations and regulations that are sadly going to, without a concrete change of understanding and expertise of the processes on the field of sustainable development that considers social interactions between the subjects involved that are a part of the process, stay merely mechanisms for constraint and by no means a way towards a sustainable development. By that we mean the development of the society as a whole that builds welfare today and the present then becomes a foundation for the welfare of the society of the tomorrow, where when achieving the set goals all cooperate evenly and equally no matter the economic or legal position, the public service as well as the executants and users.

7.3 What are innovations?

The term "innovation" has in the last decades in governmental and international documents been very popular. It has turned over from the educational and research institutions onto the enterprises where it became clear that both the world economy and especially the society depend on knowledge and communication. The efficiency of products, production processes and systems on all levels, all areas is the key for a permanent competitive position as well as for the society as a whole.

Many authors have and are still dealing with the answer to the question What is innovation? When trying to make a definition we cannot overlook the term "invention" for in real life both terms are often used, sometimes wrongly with the same, one explanation for the two. Dictionaries in our opinion do not offer an adequate content line of separation between the two terms since they explain innovation as a new occurrence or a novelty but at the same time they explain that innovativity means something referring to a (significant) improvement. We could deduct that an innovation means "invention" of something new and innovating merely improving something that already exists but both only possible on a technical field. Invention is explained as inventiveness or imagination. Deducting from the later an invention could be a new idea or an idea on how to improve, change or use etc. something that already exists. A separate distinction (excluding the restriction that it has to be technical) is therefore not offered there.

The traditional concept of innovation had at first indeed been focused on the development of technology and closely linked to the internal research of an individual company. Lately however, the concept often also integrates into the remaining business spheres. (Manochehri 2010, p. 4–14)

In theory, many authors deal with trying to define both terms where a special emphasis is given mostly to the meaning and the content of the term innovation. Some think that innovation is an idea that can in time offer an added value (Bessant and Tidd 2011, p. 4–14) but most of their opinions are that we can only talk about innovation when it is in fact implemented in practice and gets its value through commercialization (Hartley 2005, p. 27–34, Verloop 2004, p. 1–142, Freeman 2002, p. 191–211, Achilladelis and Antonakis 2001, p. 535–588). Among the authors there is no dilemma about innovation being something new or improved, the differences are in determining the moment when a "novelty" actually gets defined as an innovation.

Mulej and others (2008, p. 8) define invention as a pre-stage of innovation by defining the invention as "an idea that promises to maybe someday – usually with a lot of effort and investing – become an innovation." Innovation however, (according to the international definition) defines as "any novelty, useful according to experience and evaluation of the customers/clients".

We can conclude that an invention is only an idea (it could be totally new or it can improve something that already exists) that only after a successful transfer into practice turns into an innovation. Given, that it is not necessary for an invention to turn into an innovation, Schumpeter (1939, p. 84) distinctly divides the process of invention and the process of innovation and even believes that the later can emerge even without an invention.

The experience and the evaluation from the users can be equated with commercialization though. In the case of a positive response from the users or a positive commercialization the innovation gains its value.

In spite of different meanings innovation and invention are indeed correlated. Invention on its own does not have any economic or social value until (and if) it is implemented into practice – until it becomes an innovation. We believe though that innovation could not exist without a previous invention.

Because of this correlation Mulej (2008, p. 10) talks about an inventive – innovative process, demonstrated in the picture below.

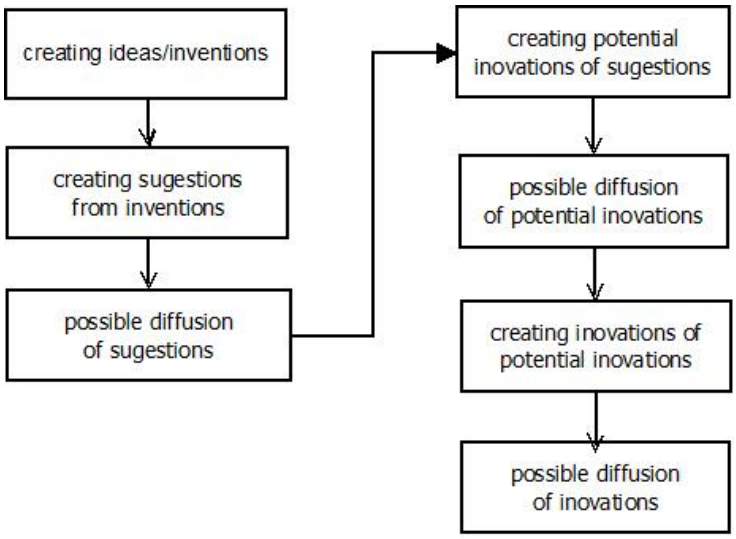

Figure 18: Inventive – innovative process
Source: Adapted after Mulej, 2008

Mulej (2008, p. 10) writes the conditions for a creation of an innovation in the equation:

Innovation = invention × enterprise and entrepreneurship × integrity × management and leadership × staff × culture × suppliers × clients × competitors × social environment × the natural environment × random events / luck

Types of innovations

When classifying innovations in theory, we come across some rather different points of view that depend on individual research focuses.

Damanpour and Goplpkrishanan (2001, p. 18–20) are focusing mainly on product – based and process-based innovations. They divide the first into the new products or services that are presented either within an organization or on an outer market and the process innovations that are divided into organization of production or services.

We can also divide innovations with respect to public or private interests. Innovations of the public interest are innovations that have consequences for a broad public; their stakeholders are usually collective entities such as countries, states, organizations and social movements. They are mostly innovations from the fields of social or political circumstances. (Wejnert 2002, p. 299) Those innovations often have long-term or even historical consequences for they can lead toward reforms also in the field of human rights.

Innovations with private interest on the other hand have mainly influence on stakeholders that are usually either individuals or small organizations. Their purpose is mainly to improve the quality of an individual's life or it is a matter of organizational and social reforms. (ibid.)

North and Smallbone (2000, p. 145–157) divide innovations into five main ranks namely on the product-based and service-oriented, development-marketing, methodology – marketing ones, process and technology based innovations for administrative purposes.

A wide classification however is presented by Mulej (2008, p. 122–123) who distinguishes between no less than 20 different types of innovations and divides them according to:

- the content of innovations (programme based, technically-technological ones, organizational, managerial, methodological),
- the consequences of innovations (distinction between the radical, that wreck the given knowledge and the applicability of equipment and to the tiny ones that strengthen the pre existing knowledge),
- the professional duty to innovate (the differences are in the ownership of an innovation; within the work related duty the owners are the employers, outside of the work related duty they are innovators themselves.).

OECD (2005, p. 18-20) defines innovation activities as all scientific, technological, organizational and commercial steps, which lead to the implementation of innovation. Some of these activities are innovative per se, whereby others or not; but are still crucial for the implementation of innovation. Research and development understatements contain innovation activities, which are not directly linked with the development of a certain innovation. Further it classifies innovation activities into three stages:

- Successfully ended and implemented innovation, by which a successful commercialization isn't a condition;
- Period of innovation activities, which didn't yet result in an innovation implementation;
- Stopping the activity even before the implementation of the innovation.

In most occasions though in the official documents the OECD systematic is quoted distinguishing innovations into four types, be they new to a company, new on a market or new to the world, as follows:

- Product-based innovations, those include a new or improved service. Here we can find also important improvements of technical specifications of components and materials, incorporated software, customer friendly and other functional characteristics;
- Process-based innovations include a new or significantly improved production or a delivery method. That includes important changes in technology, equipment and/or software;
- Marketing innovations include new marketing methods with important changes in a form of a product or packaging, division of products and their promotion or evaluation;
- Organizational innovations, including a new organizational method of a business practice of a company, organization of workplaces or organizing contacts with outer partners.

Innovations types in public services

Most research from the field of innovations and innovating models is tied to companies that can with a successful implementation of innovations into their operation ensure themselves a competitive advantage, an efficient development and also profit. Despite the fact that the value of innovation is indeed measured in inputs and outputs (material, human, with respect to time, financial etc.) we can still not measure everything according to the win/lose principle.

Public services like healthcare, education and social security cannot generate profit but they have an enormous impact on quality of millions of peoples' lives. Implementation of good ideas leads to added value of public services, the already existing ones and the potential future ones. (Bessant and Tidd 2011, p. 6)

Particularly in time of an economic crisis are innovations the key to good development projects also in the field of carrying out of public services or building of public infrastructure, not only on national levels but mainly on the lower levels like local communities. Those can define their advantages and recognize their weaknesses much easier in their development plans.

With respect to issues of public services and the construction or maintenance /management of infrastructural facilities we could, according to the OECD (2005, p. 47–53) classification, briefly define the innovations in local communities as:

- Product-based innovations, those include a good or an improved public service, where we can also add a new or in an important way improved infrastructure facilities, customer friendly services and new or importantly improved information system and such.
- Process-based innovations include a new or significantly improved method of carrying out processes including the process of adopting legislation or issuing provisions, resolutions and the like. They can also include important changes in technology, equipment and/or in software.
- Marketing innovations may include new methods of raising awareness of a population in the sense of sustainable development, a new way of charging for public services, new methods for promotion of the public – private partnership in the sense of co operations between all the stakeholders in creating a development policy and the like.
- Organizational innovations include a new organizational method of a business practice of a municipality or of a carrier of public services, an improved organization of workplaces and tasks or a new way of organizing the workload between the carriers of public services in the population and the like.

Significance of innovations

Without any regard to differences in defining and classifying innovations the theory stays unified in the consciousness that innovations are fundamental tools of public and private sectors for improving competitiveness and productivity, and crucial to achieving a sustainable development of the society as a whole. The need for innovations is a necessity without which it is impossible to even talk about a development.

Innovations are naturally not something simple or could be taken for granted. Numerous big companies lost many projects after a change on a market occurred. (Hamel and Prahalad 1994, p. 79–117) The main reasons had been that they were convinced they were good enough and given the fact that they had not been able to adapt to the changes in their environment quickly enough. (Leonard-Barton 1992, p. 111–126)

Innovations mean big changes in organizations of all sizes and legal forms as a response to the changes in the environment. Bessant and Tidd (2001, p. 5) claim that the logic is very simple: "…if we do not change our offer (products and services) and the way on which we produce then we risk to be taken over by others that are going to do just that." Those who are going to survive are the ones who are going to react to changes in time, focused and regularly. Especially the later is of extreme importance since development means that it is necessary to react to each and every change. That what was yesterday considered an innovation could tomorrow already be obsolete. It is vital to adapt to change regularly, as one goes along.

The companies where the process of innovating is a constant stay competitive and successful in their activity. There is however possible to detect at least two things in all of them and these are that they master the management of changes and are flexible enough and adaptable enough to survive at least one innovation crisis. (Kelley and Gibson 2010, p. 2)

It is essential for the public sector to be aware of the importance of innovations mostly for two fundamental reasons:

- The quality of public services has an influence on people's lives in the whole society. Without an innovative, sustainable, accessible and efficient public service and local autonomy it is impossible to even imagine a development of cities, hamlets and villages and with that of wholesome regions.
- Innovations in public services have positive effects on access to information, a faster execution of services for monetary operations and for citizens/ members of community. In addition to that they contribute to competitiveness and innovativeness of companies.

Numerous governmental and international documents witnessed the importance of innovations. With their guidelines and strategies they are trying to influence the development of innovations and the innovating culture as well as in the public as in the private sector especially:

a) To release the innovations,
b) To encourage people to innovate,
c) Encouraging and using the knowledge,
d) Use of innovations to solve global and social challenges,
e) Improvement of management and evaluating innovation policies.

The necessity of innovating and with this, also financing innovations has since long raised awareness in the economy. Progressive companies have their own sectors for research and development within their own organizational structure or they execute that important part of their development policies through other institutions. They spend a good part of their income to finance innovations and are at the same time trying to use numerous opportunities and financial encouragements for development of innovations through invitations for tender applications for governmental and international institutions (banks, development funds and similar). Often the problem of financing innovations appears to be in the small to medium size companies that are not yet established on the market or in development of new products or services that can take years.

Demographic pressures, bigger public expectations and strained fiscal circumstances are the reasons why municipalities and the public sector in general have to direct themselves into searching for innovation development solutions. For the key public services it is necessary to form wholesome innovation strategies. An execution of innovative projects or executing innovation practice or rules is impossible only from the budgetary resources. Therefore it is necessary to find alternative sources of financing just as the innovation design bases on cooperation with the private sector and on a joint search for possibilities of financing in numerous programmes in EU initiatives.

Innovations are a building stone of sustainable development of Smart communities (cities and smaller towns) and we cannot and should not characterize them as merely one of the indicators of development success or of an information and communications industry. They act as an interface on all the areas of sustainable development due to which also local communities can find in the programmes and EU initiatives numerous possibilities for financing strategically important innovation projects.

Hinter (2011) claims that innovation is the life blood of most organizations in the 21st century, but most of them regularly do things to snuff out innovation wherever it rears its head. He says that "Unfortunately, it's easier to mess it up than to get it right, and the result is that employees end up confused, frustrated, and stifled." and lists the following five things that a lot of leaders and companies do to stifle innovation:

- Lack of project leader,
- To many layers of management,
- Ignoring the brainstorming rules,
- Rely too heavily on data and dashboards,
- Under-resource your hidden opportunities.

Avoiding the well known mistakes by promoting innovation sometimes means restructuring the work organization or/and developing o new, fresh and creating space for generating ideas and managing new projects. According to the fact that archival services are public and established by the law, some changes are not easy to achieve. But on the other way such changes could represent an organizational innovation by themselves. (Hinter, 2011)

Brief overview of innovation models

The problematic of innovation models demonstrated in numerous researches in the fields of innovations and that can roughly be divided in the closed models and the open ones presents itself mostly on two levels. The first is that the innovations are mostly oriented only towards the companies' operating or IT development. The second is, as stated Eveleens (2010, p. 1), who theoretically explained that processes simply are not at a point yet where they could be used in specific situations in practical work of problem solving.

The closed innovation models have been and are still used mostly in big and strong corporations. The base paradigm of the closed innovations is namely in the conviction that successful innovations have to be controlled and protected from the public eye and in the (inaccurate) comprehension that they have within a company enough human and material resources for innovation and consequently for a successful performance on the market.

The main reason for the range of dissemination of the closed innovation models has been in the immoderate trials of protecting the intellectual ownership and at the same time within the legally and politically insufficiently specified frame for protection of intellectual ownership. The problem that has occurred as a consequence of the closed innovation models was the lack of connection between the theory and practice. On one side the research centres of the academic institutions did not apply their research and innovative conclusions onto practice, nor did they try to market them. On the other hand, the big companies that needed innovations for the development of their field and for making a place on a market for themselves consequently organized their own research centres within companies where all the innovation activities were carried out in a highly restricted environment inside which no outside subjects were included.

Chesbrough (2003, p. 35–41) is convinced that a close innovation system does not meet the wanted development objectives and that companies should not rely only on their own knowledge but should instead also reach for the knowledge of others, at the same they should also share their own innovations that are not being used in their operations with the outer environment and in this way gain additional benefits.

He defines an open innovation model as a paradigm that anticipates that companies are able to and should use as much of the outer as the inner ideas as well as the inner and outer ways to reach a market if they wish to attain a progress of their own technology.

Marais and Schutte (2009, p. 96–116) distinguish between five types of open innovation models, namely the *Product platforming* (this model bases on a discussion on a half-product or a product development with intent to contribute to its functionalism and the added value), the *idea competition* (the model enables a competition organizer to gain as big a number of good ideas as possible, in an inexpensive way and at the same time get an insight in their customers' needs, the *inclusion of customers* (that model is intended for including the customers into the last stage of product production or the testing of a product in which way the company receives the feedback instantaneously), the *joint designing and developing of a product* (a company hands over the creating and the development of a product to outside partners. Such model is cheaper and usually faster as an independent product development.), the *innovation networks* (the model is intended for a target oriented problem solving in relation to research and product development).

An open innovation model as an "anti-thesis to the traditional vertical integration model" (Chesbrought, Vanhaverbeke and West 2006, p. 1) has in comparison to the closed model numerous advantages. It reduces the cost of organizing one's own research, offers possibilities for productivity improvements, and includes numerous stakeholders in the process of the very beginning of development, increases accuracy of market research and ensures a faster and simpler marketing. Its weaknesses are however mostly in the danger of information leaks, theft of an intellectual ownership, a complex approach to a supervision of innovations and selection of outer innovations as well as in the frequent corrigenda of the development strategies in order to ensure a bigger profit due to including outer innovations. (Chesbrought 2003, p. 21–63)

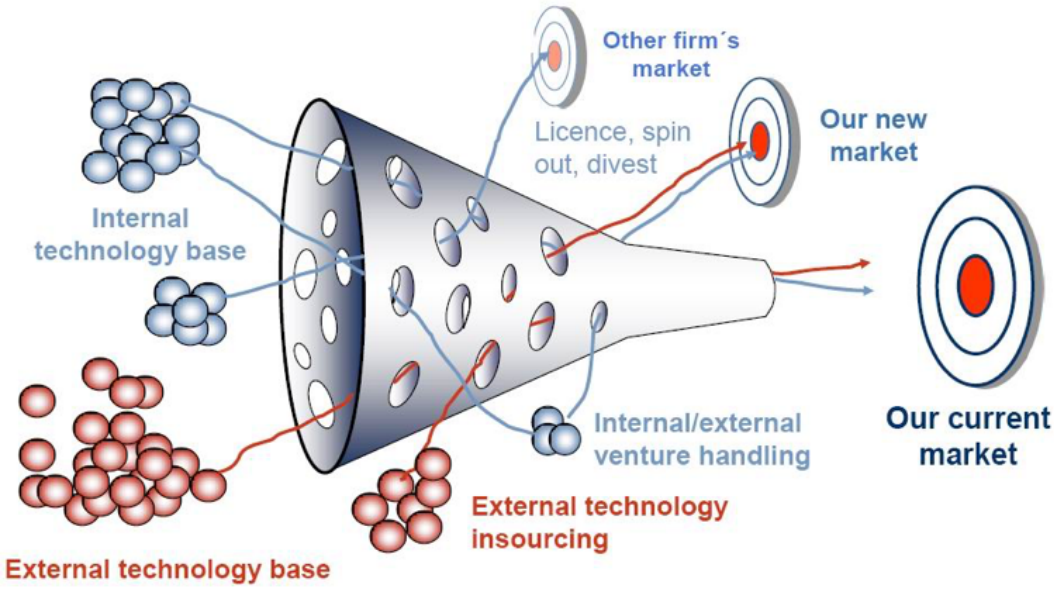

Figure 19: Open innovation model
Source: Chesbrought, 2003

Innovation models are closely linked with business processes in a company and consequently coincide with them according to their structure. In the picture below we show the structure of a traditional innovation process.

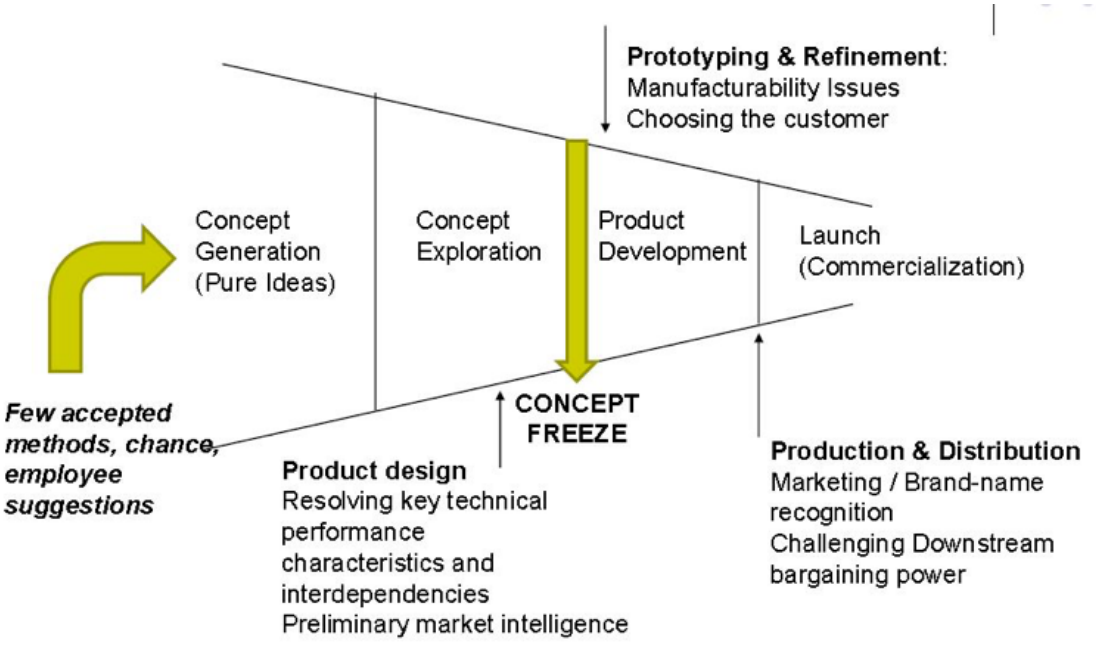

Figure 20: Traditional innovation model
Source: Murray, 2008

Unlike the traditional model the phase model of innovation process (demonstrated in picture below) has a clearer structure and is for a general understanding of project development much more appropriate. It is a formalized process of project management that is able to oversee more development processes at the same time. It enables a possibility of defining, tracking and an oversight of a project in accordance with the decision making criteria and a series of key business decisions. It simplifies reporting on individual phases of a project, since it includes standard terminology, integrates business functions and at the same time anticipates termination of those projects which do not fulfil the expectations. Somewhat problematic is only the inflexibility when introducing the changes within a process (due to the conditions on a market, replacement of the staff or equipment).

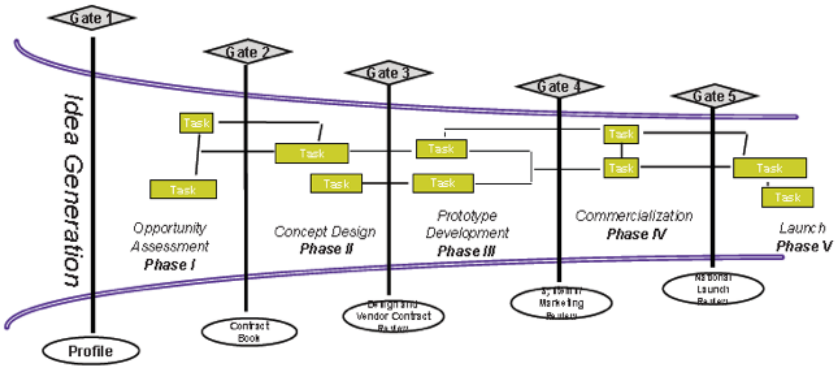

Figure 21: Phase gate model
Source: Murray, 2008

In our opinion the key advantage of the phase innovation process is the structure that is because of the time, content and process transparency the most appropriate one for co-funding.

Notwithstanding the fact that the models of innovation are in theory adapted mainly for business operating, they may also be applied to the innovation activities of the public sector or local communities. Considering the fact that local communities do not have sufficient material and personnel resources for innovating on their disposal, the close innovation model is entirely inappropriate. Its unfitness is further demonstrated also in the exclusion of all outer stakeholders, which is from the point of view of the concepts of sustainable development or smart cities simply unacceptable.

An open innovation model however can meet the needs of local communities because it bases on a wide inclusion of all participants (the public sector, the private sector, users) and in addition to that does not demand huge personnel or material resources. The structure of the phase model of innovation process is also in addition to that simply ideal for the co-funded projects. In the period when local communities are struggling more and more with the financial deficits while they are legally obligated to fulfil their legally based tasks and at the same time reach the sustainable goals of development strategies, the open innovation models can offer a rather good way for carrying out the co-financed projects.

7.4 Financing innovations in public services

In the past the role of local government in the performance of public infrastructure was relatively simple. Local communities, provinces or districts were the primarily investors into the public infrastructure (energy [heating, cooling, lighting], management of agriculture, wood and building land, hospitals, roads, railways, public transport, schools, waterworks, garbage, air, broadband, and internet services for the citizens, healthy food). All this needs were covered predominantly from budget sources or with direct barrowing through local communities. Very common forms of financing were as well self-imposed contributions from citizens. Duo to the public sectors inability of covering the financial burden on one side and new technologies and innovation on the other side, this form of financing does not satisfy any more the growing needs for public standard. This means that local communities and government will be forced to look not just after new sources but as well after new ways of financing. At this point special attention has to be given to new technologies, with which local community and government would have to be acquainted with in order to keep on track with the progress, and innovation, which can be of crucial importance to sustainable development. Some experts from the field of innovation (Cooper 2005, p. 4–6, Kaplan and Norton 1992, p. 70, Albury 2005, p. 51–56) think that innovation are the key to survival of an organization, wherein it isn't important if the organization is market orientated or it works as an operator or manager of public services. Cooper (2005, p. 4–6) even claims: "This is war. Innovate or die."

The transformation of European cities requires considerable investment. Unfortunately, the debt crisis seriously affected a number of municipal budgets. The fundamental problem of financing new development projects is that cities, in addition to the large investments have neither the resources nor good credit ratings for searching cheap sources of financing. Additional austerity governmental measures restrict resources in municipal budgets. Thus leads to congestion in the transformation of cities and decarbonisation, which is a prerequisite for reducing greenhouse gas emissions. These in turn have a negative impact on the industry to develop low-carbon sector, employment and ultimately the key economic sectors such as energy, transport and ICT.

The main problems in financing of innovative solutions for the development of public services can be briefly defined as follows:

- high perception of risk for innovative solutions in the field of energy efficiency,
- uncertain energy prices and political uncertainty about the price of fossil fuels,
- very large investments,
- long term of repayment of the investment,
- limited capacity of public funds (there is no money in the budget, inability of seeking funds in the capital markets).

Given the strategic importance of cities it is an urgent need to find all possible financial tools for the implementation of development projects in smart cities and to develope mechanisms for pooling projects and create them attractive for banks and investors to attract long-term loans from specialized institutions and to develop new systems with off-balance sheet investment mechanisms of private capital and public private partnerships.

The main models for financing innovation projects for development of smart cities are:

- budget funding (state or municipal budget),
- combined budget funding of several municipalities for the joint project,
- budget funding in combination with funds from EU programs (there are several possible combinations:
  - budget of one municipality + EU funds,
  - budgets of several municipalities + EU funds,
  - combined budget funds of State and Municipalities + EU funds),
- funds from EU programs,
- private equity investment – public-private partnership,
- Crowd financing.

7.5 Public private Partnership

Local communities are more and more facing the problem of financing public services, especially in managing and building infrastructure. The resources for financing public services are getting smaller but on the other side the technological development is speeding the needs of higher public standard.

To help financing the city development projects EU developed some programmes and initiatives. In their frame the municipalities can develop innovative projects and candidate for the missing resources. Cohesion policies together with European Fund for Competitiveness and Innovation (Horizon 2020, COSME) also enable development of investments in integrated energies, transport and ICT.

Despite the relatively well-conceived legislation and numerous programs of European Union from which they can draw on the necessary resources, local communities still have problems with ideas, preparation and application-oriented projects sustainable.

Crowd financing is the newest form of financing projects. It is a form of massive investment of private capital individuals in the project, which for various reasons, believe that the project is enough innovative, attractive and important. As the main "channel" for the mobilization of financial resources does the Internet work. Although this funding mechanism is still in its infancy, the data show that gradually gaining ground. Estimated investment in projects in 2010 reached €400 million in 2011 €1.2 billion in 2012 more than 2.2 billion €. With such growth crowdfunding or crowd financing can respectively be classified in the ways of financing large projects for smart urban development.

The classic way of financing the construction of infrastructure from the state budget has become unacceptable; consequently the last three decades have brought radical changes around the world.

As a consequence of these changes two interdependent trends have emerged:

1. The withdrawal of the state from the field of infrastructure construction and operative management and
2. The evolving definition of the state's role as a regulator of infrastructural activities increasingly provided by the private sector.

According to Milutinovič (2000, p. 442–451) in the procurement of the funds for public infrastructure financing, three different methods have become dominant, depending on the available resources:

a) Financing from the current revenue; it foresees that infrastructure investment expenses are covered directly from the current budget revenue of the local authorities or state grants;
b) Loans; comprises the covering of financial sources for infrastructure by issuing securities or raising loans in the capital market;
c) Public-private joint ventures, including privatisation, that involve a partnership and contractual cooperation of the public and private sectors according to one of the possible forms of the cooperation of private subjects.

The interweaving of public and private interests can materialize in several different forms, and most often in the following three combinations:

- Public ownership of objects and public management;
- Public ownership and private management;
- Private ownership and private management.

The involvement of private capital (both human and material) in public infrastructure is not new in the world. The centre of gravity of the problem is the protection of individual interests either in the private or public sector, which does not allow a true partnership and is rarely able to overcome the relationship of client – contractor.

Several variants of infrastructure projects with private funding exist:

BOT – Build – Operate – Transfer

This is the basic variant, where the infrastructure is owned by the state after the project is finished. To that point it is owned and operated by the concessionaire/private partner**.**

BTO – Build – Transfer – Operate

In this variant the infrastructure is owned by the state immediately after construction. The concessionaire is rewarded with the right to operate the object for a limited time.

BROT – Build – Rent – Operate – Transfer or BLOT – Build – Lease – Operate – Transfer

During the contract term the infrastructure object is put up for lease by the concessionaire.

BOOT – Build – Own – Operate – Transfer

In such projects the concessionaire is obliged to construct, finance and operate the object. In return they can levy the taxes and costs from the users. In such projects the concessionaire owns the object until they transfer the ownership to the state or the local community.

BOO – Build – Own – Operate

This abbreviation stands for projects where the concessionaire owns the object they operate and have no obligation to transfer ownership to the state or the local community.

Private investments in the infrastructure can be fully realized in BOT model projects. The short-form BOT characterizes a business relationship form, whereby the government or the local community grant a concession to a group of investors (a project consortium) for development, administrative and commercial marketing of a specific project. The consortium or the legal person who establishes such a concession-project is liable for developing the project and managing the concession in accordance to the contract.

The element of project development is a key element that separates this type of operation from an ordinary public concession. The development of a project in reality translates into the construction of necessary infrastructure. In a classic investment operation the investor takes charge of the entire financial burden. In BOT operations the financing is handled by the building contractor, motivated by the prospect of income from the operation of the concession to pay off any loans.

As the state/local community isn't required to invest in the infrastructure, they could be expected to maintain a passive attitude, expecting just to collect the concession taxes or to gain from the free infrastructure, and use their monopoly to entice the investors to make their best offers. But of course such a perspective would be too simplistic. The state or the local community should be aware of the following:

- In the end they will be the owners of the infrastructure and will need to ensure the continuity of services after the concession ends;
- Due to the heavy burdens and an unequal distribution of risks, the private sector will not be interested in such projects unless the state ensures an environment that will be legally and administratively favourable for the investors;
- The concession operation has to be controlled, as the issuer of the concession is obliged to provide the public services at a fair price.

As a result of these factors the state/local community has to display interest in the technological design of the project and at the same time offer guarantees and initiatives in order to even the distribution of risks and attract private operators and financers.

The BOT model has become a globally established scheme for larger, especially international projects. We could say that the model is suitable for the establishment of infrastructure for public offices that are based on a profit-oriented supply of services and have to be economically justifiable. The question is, whether the BOT model could be used as a fulcrum in order to ensure the progress and realisation of both large and small, difficult and simple, international and national projects, which our societies, both developed and undeveloped, need very badly.

All these forms of BOT model have their advantages and weaknesses. The latter lay mostly in the difficult distribution of risks and interests. The public owner may not want to engage in the providing of services, and at the same time worries about the fate of infrastructure and the respect for public interests if the activities are taken over by the private sector. On the other side the private partner, despite the entrepreneurial spirit, won't be willing to invest in the infrastructure unless there are guarantees concerning the income and duration of the services. (Ilešič 2000, p. 62)

Disadvantages of BOT projects

The transition to partnership between the public and private sectors has found its legality in the roles taken by the public authority and the private subjects. The former is responsible for providing the essential services to the population according to the needs of the society. The latter service providers implement the services according to the cost/benefit criteria. Partnership of the two enables the association of both roles. Still, decisions must be rational, and the public authority needs to review all possible risks of such cooperation and thoroughly study the procedures of partnership formation to create successful partnerships (Jankovič 2006, 151).

What's essential in the entire process is the project itself. It should dictate the distribution of risks in order to stay in line. Taking charge of a risk should be compensated, and the efforts to reduce costs may influence the risks. A typical example is the risk of construction, which can be mainly controlled by the private party and therefore the insurance against that risk is reasonable. For example, the insurance costs can be incorporated in the construction price. In contrast, the commercial risk is often very big and the insurance for the risk can be costly for the private party. That is immediately evident from the higher price and higher subsidies in case the project is not self-sustainable. If the community takes charge of that risk, there is a danger that they may have to pay the compensation for the lack of revenue. Still, that can be acceptable if the project serves an important socio-economic interest.

The main categories of risks are (Aoust et al 2002, p. 28–46):

- Technical risks (design, construction);
- Financial risks;
- Demand risks (exploitation);
- Revenue related risks;
- Higher force risks;
- Macroeconomic risks;
- Legal risks.

Some of these risks are limited to the private sector, e.g. the non-remunerative investments, and some to the public administration (inefficiency of public offices).

It is otherwise true that the risk in itself is not a disadvantage yet. However, when we talk about disadvantages risks are most likely to fall into this category. They transform into disadvantages at the moment when we are least prepared or when we do not know how to or cannot avoid them.

In comparison to the traditional form financing an infrastructure the BOT model brings on the following disadvantages:

- BOT projects are much more demanding than traditional investment programs, in the financial sense as well as in the legal sense;
- A big trap is having insufficient knowledge about the BOT model and not being qualified for using it in the real world;
- The BOT model demands clear and transparent legal regulations and foreseeable conditions for carrying out the activity;
- The costs for preparing and financing BOT projects are usually higher than for traditional forms of financing;
- In most cases, successful realization of a BOT project means a higher price for end-users of the service;
- BOT projects usually create revenues in domestic currency, while creditors can also be foreign partners. This creates a great risk in exchange rates, currency risks and risks in transferring capital (Perrot J.Y. et al 1994);

Simplifying the matter we can say that the state/local community, whereby the concessionary is a foreign partner, does not get much or anything at all from a BOT project. The capital in which a foreign partner has invested into an infrastructure shall be returned them in the form of payment for services and not to the state/local community. However, it is true that the state/local community has fulfilled its obligation in ensuring public services. Besides this, when talking about traditional BOT business, the ownership and administrative rights of the infrastructural building are transferred to public partner after the duration of the contract.

The advantages of BOT projects

It is noticeable that intervening with partnerships between the public and private sectors ensures the operation of public services and infrastructures and offers numerous advantages although; it remains somewhat complicated for its realization and constant monitoring.

A BOT project is based on a partnership between the public/private sector and investors, whose aims are to draw-up, plan, construct and manage infrastructure projects that are usually ensured by using traditional mechanisms such as public tenders.

This partnership does not only mean intervening in the private sector for financing investment projects on the basis of revenues from the infrastructure, but also taking into consideration the competence, knowledge and experience in managing the private sector for the realization and operation of public projects in the most effective way (Namlard 2002, p. 8).

Reducing budgetary requirements

Many times, the BOT model allows for the development of projects with little or even no usage of their own funds (many times, a fixed level of subventions is often needed), as private funds can be used. In many cases, the costs of the services can be transferred to the end-users (utility costs…). A price is calculated, which is close to the real cost, which is done with the aid of an acceptability campaign carried out by the public administration.

Some projects, which are financially profitable even enable for the establishment of new sources by sharing the profits amongst the contractors and the public administration (tolls, taxes…).

It is possible to develop a project without increasing the debt burdens or the affected state/municipal budget. Public sources can therefore be disposed of for other purposes.

The state's image or their ranking is better and enables them to access less expensive capital markets and as a result also attract foreign investors more easily.

Counter value of invested funds

Besides reducing the burden on the budget, the BOT model (under the condition that we use it for suitable projects) allows for the optimization of projects and increasing profits for the allotted investment. These advantages appear in the following elements:

- Linking and synergy during the planning, constructing and operational phases. Of course under the conditions that we have all three phases under one tender;
- Innovation plan, reengineering and effective management;
- Emphasis on the quality of the service for the end-user;
- The way it is dealt with, which tries to reduce the total costs of the project throughout the whole life cycle: investment + maintenance + operations;
- Better usage of capital and creating additional revenues.

The optimal distribution and transferring part of the risks to the private sector

Projects regarding public and private partnerships almost always bring on a really high level of risks. Especially, because of the great financial amounts that are at stake, because of the uncertainty related to the costs of construction including operations and the uncertainty of revenues. The financial construction within the framework of the BOT model is based on the adjustment of distributing the risks after these have already been identified and enables that a certain part are transferred to the private partner if they are easier to control than the public administration.

The public administration can greatly reduce their exposure to risks, whereby in spite of everything it ensures the optimization of the project in this area.

Realistic development and being in command of the costs

The financial construction of the BOT model in the public administration enables for a better evaluation of the real costs of the project. A precise and real evaluation of costs is also necessary for the sheer promotion of the project as it aids attracting financing in the form of capital and loans. With its aid, we can avoid the cost deviations of the project, which are frequent in public infrastructure tenders. With the transfer of responsibility to the private partner in a BOT model, we can also avoid the undervaluation of real costs ex ante. Real costs enable for a comparison with the standard, which can serve as a basis for improving the quality and effectiveness of other public services in the future.

Economic and social benefits

If the worries of the participants are merely of a financial character, then the BOT project will most certainly suffer as a whole. We must not forget that the economic and social benefits must stay at the forefront of the partners' interests in the BOT project especially, because the project will be financed to a great extent from the revenues that will originate from it. It must be planned in a way that the best service for the best price will be ensured, which will satisfy as many end-users as possible.

The principle, which is hidden behind the term partnership between the public and private sectors, is based on the fact that the public administration remains responsible for the services it provides for its citizens and is not necessarily responsible for the investments themselves. This is how the public administration with the help of a financial construction in the form of a BOT model can relieve the burden of investments by devoting itself, above all, to the quality control of the service. On the other hand, the private partner possibilities in optimizing its investments (which is their job) so they can ensure the quality that is being demanded.

Fast realization and the reliability in executing the project, which stimulates economic development

If the project was evaluated as being beneficial to society, its installation in the form of a partnership between the public and private sectors can allow for the acceleration of its final realizations. At this level, the decision to a great extent depends on the disposability of budgetary funds, which can also be the reason for its postponement to a later date.

In this case, the projects get a more political dimension. On the other hand, its quick realization will also ensure a quick benefit for society as well as for politicians who connect a certain name with a certain project. This holds true regardless of the level of development in a country, which realizes its projects on the basis of partnerships between public and private sectors.

The modernisation of the economy and the indirect benefits

By accelerating the realization of projects, we also enable the acceleration in modernising the economy. Developing infrastructures and implementing new technologies is faster and because the realization of projects is directed towards the quality of the service it is more possible to take into consideration the needs regarding demand and adapt them to development more quickly resulting in enabling fast modernisation of the economy. The result is numerous indirect benefits for the country's economic development (i.e. higher standard of services, the use of environmental protection and modern technologies and the implementation of technical knowledge, etc.)

Access to financial markets and development of the local financial market

The use of private forms of financing for environmental protection projects has a completely positive macroeconomic financial effect for countries in development. Their access to financial markets is improving. By obtaining international capital, they strengthen the country's image in markets and they base themselves on huge operators, who have privileged access to international markets.

The private form of financing enables for a timely development of the local financial market. These complex constructions actually limit the number of financial sources and are often effective as a catalyst for the local market, which has to modernise and adapt itself.

Social advantages: improving public services

If we enable for a better identification of costs and a reduction in budgetary expenses for public administrations, the big project constructions under the BOT model allow for a better concentration of funds for financing that part of the project, which they have to ensure themselves, but is not profitable. Freeing up financial sources for other public services where a partnership between the public and private sectors is not possible or is possible just in a smaller form (healthcare, education, social protection, etc.) can allow the public administration to direct its funds and energy towards other social tasks.

Enabling lasting development

Contrary to widespread belief, intervention via the private sector with the BOT method can enable better consideration of all dimensions in development. The construction of infrastructures, which are necessary for the proper operation of public services, demands a great amount of investment and flexibility for operations. BOT models enable for faster realization of public services and lower costs for public finances.

On the other hand, entire public service cooperation with huge international groups means accessibility to the most modern technologies, which take into consideration the needs in the development sense, adapt themselves to the regulations around the world and are capable of innovating and adapting their offers in developing needs in the area of public services.

The implementation of the BOT model also enables for solutions that are better adapted to the demands according to the quality of the service, economic capacity and the public administration.

The role of the state in concentrating on their initial tasks

As the BOT model frees up the public administration from its administrative tasks, it simultaneously allows for it to concentrate on its initial tasks. As a result of this method, it can identify the needs and costs for public services more easily. It can also, in a very effective way optimally evaluate the level of public services, which the society wants and the costs involved. As a result, it can decide on economic and social effectiveness more easily.

Technological benefits

BOT projects enable for the arrival of important professionals with international experience such as constructors, operators, engineers, legal advisers, systems analysts and financial analysts, etc. We can find these professionals alongside private partners as well as in public administrations. This has resulted in an important transfer of technologies, know-how and experience, which can be seen in many areas such as:

- Construction and systems for optimizing economic consumption (it is possible to offer the most modern technology and it is possible to adapt to local attributes);
- Managing the project and economic consumption;
- Financing engineering;
- Institutional engineering;
- The quality of software (The operations of the majority of industries in the economy has significantly changed with the forceful penetration of internet technology and as professor Leskovar states, the paradox of is that individuals and organisations are forcing themselves in the intense usage of program equipment, which frequently changes, is not user friendly for the entire population and is expensive (Leskovar 2000, p. 491–496);
- And many others.

The transfer of technologies, know-how and experience first occurs in local companies that directly cooperate in projects as well as the rest of the companies at the local level. It also has an influence on the administration, which monitors the project, the local financial organisation, etc. An important factor is certainly the training and qualification of the local labour force. Foreign international companies that are part of the project will especially try to focus on the local labour force who they will adequately train. On their part, they will only send the most necessary group of staff, who are necessary for completing the transitional phase.

The new role of public administration

The political advantages that originate from this are certainly not negligible. By directing public administration operations towards their initial tasks and intervening with the partnership between the public and private sectors, once again it is possible to define their role as a subject that directs and supervises and no longer as a subject in the role of owner and manager of property. Besides the benefits, which these projects bring to society, they also enable for stimulating the development of effective services, which have been better adapted to meet the demand. As a result, public administrations come out on top because they ensure a better quality of services, by directing its funds in way that takes into consideration the social points of view more strongly. Furthermore, implementing BOT projects allows for the rethinking of the distribution of roles between the public and private sectors.

The assignment and "non-resignation" functions

BOT projects allow for alluring private investors, whereby connecting public projects with personal profit does not occur. In essence, we can define BOT projects as delegating the implementation of public services for a defined period of time. Just as well it does not alienate public property within infrastructures. Infrastructures, that had already existed before the contract and new ones as well that have originated on the basis of concessions in fine, become owned by the administration that gives the concession.

The public authority preserves its function in appointing public service projects and assures their legal regulation.

A partnership between the public and private sectors allows for the preservation of the essential "public" part of these services and avoids the accusation of saying that it is "giving" the property to foreigners or third parties.

Stability

The above described social and economic advantages evidently positively influence economic and politically stability, as well. Besides this, the contracts are signed for a period of time that is longer than the political mandates. In general, public services are, directly as well as indirectly less touchy for the outcomes of "elections". The maintenance and the quality of services are also less subject to this type of risk and the projects must show a true social-economic character in order to be chosen. On the other hand, with the improvement of public services without any excessive pressure in the area of taxation, BOT models conjure up economic and social stability.

In spite of this fact, it is worth emphasising once again that it is necessary to avoid rashness.

It is essential that we take enough time to prepare society and administrations really well, foresee the time period of transition so people can come to terms with the fact that it is necessary to pay for the service (or at least a part of the service) and that we ensure good regulations, which will help us prevent immoderations.

Conclusion on Public private partnerships

BOT projects are a specific combination between traditional projects and ones with concessions. However, in spite of the many advantages it is especially necessary to take into consideration the basic methodologies of BOT projects, which are:

- Well structured financing of the project in the framework of a partnership between the public and private carriers enables for the improvement of this project. Moreover, the incorporation of the financers is a guarantee for their quality and optimization. However, it cannot ensure the life cycle of the project, which in itself does not have sufficient economic and social good;
- Financers closely monitor the quality of the participants and the quality of the project and the project's environment: the institutional and economic framework, the quality and incorporation of builders, the legal and technical abilities of the concession giver, and the economic parameters of the contract…;
- The ad hoc structure of the company for the project is also important, which is the project carrier and connects the active items of the project and links up the partners in the project;
- The intervention of the public administration in the area of financing the project, which is in the form of a partnership between public and private carriers is often times necessary and founded because of their social-economic interest. Intervention is only possible with the input of assets, funds or guarantees;
- The traditional forms are no longer adapted to levels of risk (few assets, revenues are founded only on the flow of funds, which are evaluated with a specific level of uncertainty), the value nor the duration of the partnership between public and private carriers.

BOT projects are also effective for the state and local communities and are the best possible method (with the lowest costs) for building a public infrastructure and realizing its usage in the economy by ensuring the best possible services. The reason is in the lack of funds as well as in the lack of adequate human resources. In the case of a BOT project, where the concessionary is a foreign party both the state as well as a local community will have to come to terms with the fact that the profits are going to go abroad. Evidently, this problem will have to be solved somewhat pragmatically, especially when legitimate interest for implementing a public service project exists.

Last but not least, we cannot and must not forget the end-users (thus the citizens). For them, BOT projects are going to represent two different sides of a coin. Legislation will represent quality and an undisturbed service, which by all means will satisfy it. The other side of the coin represents the payment aspect for its implementation. Regardless of the fact if the concessionary is a foreigner or a domestic legal person, the service will have to be paid for. The price will be higher than in the case if the state/ local community would carry out the activity in another form (for which it will probably not have the human resources or the funds). Not only will the profit have to be paid for but also the interest on the capital, which the concessionary will take.

The end-users will simply have to radically change their standpoint on service consumption in which public administrations have assured in one form or another and it will be necessary to come to terms with the fact that services simply cost more.

The latter is of course necessary to add an awareness of the importance of sustainable and balanced regional development, but without the support of adequate resources (both material and human) it remains just a wish.

7.6 Smart municipalities

Forming different strategies in order to reach urban growth in metropolises of different regions had at first been based on information – communications technologies (IT) and has consequently caused a vast range of research in the field of urban development, urban innovations and IT sector innovations. An undue prominence (merely) in the field of IT as the main (and the only) foundation for the assessment of urban development has avalanched critiques out of which we can read out that such a strategy of development neglects numerous other possibilities of development of cities and at the same time it underestimates the negative influences from the new technologies (Hollands 2008, p. 306–319). Paskaleva (2009, p. 405–422) and Odendal (2003, p. 585–607) claim that the advantages and the possibilities offered by IT in fact do need to be used however; the urban development has to be built on perspectives that enable integration of more participants, more sectors and more levels.

The definition of a "smart city" that has for long been tightly linked to IT development has started to change and supplement. Komnitos (2002, p. 337–355) believes though that is mostly due to distinguishing between the terms "smart city" and " digital city" where he defines the later as an intelligent city that is oriented in a strong integration of three main dimensions of intelligences existing in a city, namely the human, joint and artificial intelligence.(Komnitor 2006, p. 17–18, 2008, p. 122–123) A special characteristic of an intelligent city that is to say a highly developed area of innovations that are in addition to the ability to solve new problems, the main characteristics of intelligence. (Komnitos 2006, p. 53–61)

We are convinced that merely setting a line of division between the smart and the intelligent cities was not in fact the only reason for redefining the definition of smart cities. The more likely reasons could be in establishing that the innovations only in the field of IT and a revolutionary development of the sector were simply not enough to achieve the wanted effects as well as in the deficit of an active cooperation of multiple sectors which would contribute to a more even development of cities.

The concept of a smart city differs from the concept of digital or intelligent cities by focusing rather on the human capital and education as a driving force of an urban development than simply on the role of the IT infrastructure. (Jung, Phaal and Sang-ho 2013, p. 286–306)

Nor the definition nor the concepts in theory on their own are unified which is no surprise considering that the goal is to achieve a sustainable development for which again there is no unified definition. Some authors have been, when setting the priorities of the concept, leaning towards a more efficient, sustainable and a live model of urban development that has a fundamental vision of environmental and social durability. A smart city is therefore simply called a sustainable city. (Cozens 2008, p. 429–444, Marshall and Toeffel 2005, p. 673–682)

Having stated that, the fact that the concepts of development and consequently the definitions are indeed changing due to the additionally acquired knowledge, innovations, possibilities and last but not least the new, different needs of people as well as of the environment, should not be overlooked.

Zygiaris (2013, p. 218–224) claims that a smart city is a "generic term describing an innovative urban ecosystem based on information technology". As a help to the designers of innovation ecosystems he conceptualizes a model constructed of seven areas within which the cities should find their priorities, put them into action and in such a way accomplish a sustainable development. The areas he defines are the following:

- A city (a tradition of their own, an identity of a city, smart priority tasks, people as the driving force of cities and the behavioural impact on the city's historical and cultural heritage.)
- A green city (new urban theories with an emphasis on environment and natural resources protection)
- Networking (spreading of the green economies and the broadband economy)
- Responsiveness (a new generation of the interactive technologies)
- Free integration (open source internet services)
- Applicability (infrastructure, smart networks, gaining energy from recyclable sources and the like)
- Innovations (creating a fertile innovation environment for new business opportunities).

A smart city should by content mean a modern, urban centre in which the development would with intent to increase the competitiveness run equally in the IT area as well as in the social and environmental areas, claims Caragliu (2009, p. 2–14). It is necessary however to take into the consideration the six important factors in order to be able to call a city smart. If we summoned up the results of the final report on the smart cities prepared by the Centre for regional sciences at the Vienna Technology University (2007, p. 10–12) we can establish that they are in some way consistent with the traditional and the neo-classicistic theories of urban growth and development. Especially, since they are based on the theories of regional competitiveness, transport, IT, economy, the natural resources, the human and social capital, the quality of living and cooperation of citizens in city management. We can therefore say a city is a smart city only when the investments in the human and private capital as well as in the traditional and modern communication infrastructure enable a sustainable economic development, a high quality of life and a wise managing of natural resources with a cooperation of the inhabitants.

In the direction of smart cities there are a lot of efforts at European level in research and financial programs and supporting initiatives. Definition "smart city" by itself and its content in form relate primarily to large or medium-sized cities. With regard to the high concentration of people in big cities these efforts are understandable.

However, we believe that even small local communities are an important part of society and they should be treated just as seriously as the big cities, especially in regions where there are no metropolitan areas and the population is inhabited in many smaller local communities.

In ensuring sustainable development, both big cities and small local community has substantially the same functions in terms of development of regional competitiveness, transport, ICT, economy (in small rural municipalities Agriculture is also an important factor), natural resources, human and social capital, quality of life and citizen participation in the management of the community in which they live.

Thus, large cities and small municipalities are obliged to provide public services, both economic and non-economic. Commonly to a lesser extent but still the well-being of the population in small municipalities is also measured by the quality and accessibility of public services.

A quick comparison of non-economic areas shows that large cities usually have universities, opera houses, clinical centers, etc. Small municipalities that do not have (what actually no one really expected), but there must be guaranteed at least basic health care and basic (sometimes even secondary) education. Usually the smaller places traditionally have their local theater or performance spaces.

If, as the main problems of big cities air pollution and the environment due to industrialization and transport and uncontrolled release of greenhouse gases can be considered, the main problems of rural areas and small towns definitely are pollution of groundwater by herbidici, poor accessibility (road networks, broadband) and the impact of climate change on agriculture.

It is certain that both big cities and smaller municipalities have the same needs. The difference is only in the setting of priorities and due to small size (both territorial and demographic) the size of the investments. In doing so, we should not ignore the following facts:

- large cities have several options for implementation of high technology and promoting innovation because they have more resources within reach (both financial and human),
- most of the research in the field of urban development relates primarily to the metropolis and big cities. Medium-sized and small cities, where the development rules are different (in the struggle for competitiveness they have less critical mass of resources and organizational options) remain insufficiently explored.

Promoting sustainable and smart development of major cities, disregarding the different needs of the population of small towns or medium-sized and smaller cities could eventually lead to excessive migration to large cities and the abandonment of activities which are typical for the smaller villages (disappearance of traditional crafts, etc.) and culture. That could also mean supersaturation of the population in large cities and regression instead of the development of small towns.

This problem is well known in the abandonment of agricultural activities and migration of population in larger cities. Analogy smart cities and smart municipalities (smart communities) is consequently a logical and urgent need.