Flanders District of Creativity

Knowledge Partner

Vlerick Leuven Gent Management School

the Autonomous Management School of
Ghent University and Katholieke Universiteit Leuven

RESEARCH REPORT

THE CREATIVE ECONOMY
Challenges and opportunities for the DC regions

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April 2006

FLANDERS DISTRICT OF CREATIVITY

Flanders District of Creativity is the Flemish organisation for more business creativity. Flanders DC, founded as an NPO by the Flemish Government, is a widely supported organisation in which Flemish business, academia and public institutions cooperate to build a more creative region - because creativity helps companies compete better and governments of creative regions ensure a healthy economy and job creation.

Flanders DC provides creative fuel through:

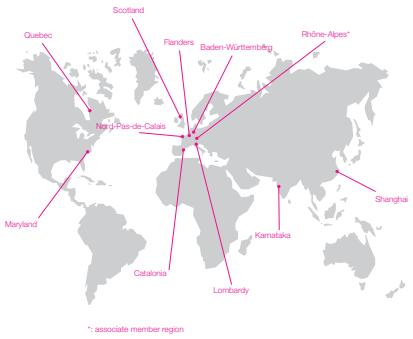
1. Research and education in the Flanders DC Knowledge Centre,
2. The creation of an international cooperation platform where regions and their business and knowledge workers can glean inspiration from the best international examples,
3. A number of awareness raising initiatives.

1. THE FLANDERS DC KNOWLEDGE CENTRE: SCIENTIFIC SUPPORT

The Flanders DC Knowledge Centre disseminates information about creativity to companies and organisations. The Flanders DC Knowledge Centre is a cooperation between Flanders DC and the internationally respected Vlerick Leuven Gent Management School.

Each year, the Flanders DC Knowledge Centre publishes several reports. These studies focus on the role of creativity in the business environment and identify obstacles and accelerators to competitive growth. The research examines the international, regional and business context.

2. DISTRICTS OF CREATIVITY: INSPIRATION FROM THE MOST CREATIVE REGIONS



Coming up with answers to global challenges is best done in an international network of excellence. Flanders DC aims to unite the most dynamic regions in the world in the 'Districts of Creativity' network, with one aim: to learn from the very best. Flanders DC unites the leading creative regions every two years in the Creativity World Forum. At the Forum, government leaders, entrepreneurs and knowledge institutions get together and exchange ideas about how to tackle pressing economic problems and make their regions hotbeds of innovation and creativity.

CREATIVITY WORLDFORUM
November 15 -16, 2006 - Ghent, Belgium

3. RAISING AWARENESS: THE BEST WAY TO PREDICT THE FUTURE IS TO INVENT IT - ALAN KAY

Flanders DC encourages entrepreneurs and citizens to look ahead and find creative solutions today to the problems of tomorrow. Flanders DC has developed an idea generation tool to encourage people and organisations to take the first step towards innovation. In addition, Flanders DC is responsible for a general awareness campaign under the name of Flanders' Future.

jij bent FLANDERS' FUTURE

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1 INTRODUCTION

In 2004, Flanders District of Creativity (Flanders DC) set up a network of creative regions worldwide with the object of exchanging experience and learning from each other's practices in the field of economic policymaking.

Up to now, the Districts of Creativity network (DC network) consists of ten member regions (Baden-Württemberg, Catalonia, Flanders, Karnataka, Lombardy, Maryland, Nord-Pas-de-Calais, Quebec, Scotland and Shanghai) and one associate member region (Rhône-Alpes), spread over Europe, North America and Asia. All these regions have sufficient regional competences to develop their own economic strategy and to act accordingly, primarily on economics and the labour market, but some also in areas such as education, science and innovation. Furthermore, all regions that have joined the network show the open and creative mindset that is vital for reaping the benefits of the geographical, economical and cultural diversity that is characteristic of the DC network. But above all, what unites these regions is that they are home to policy makers who believe that creativity is crucial to enhancing their region's competitiveness and ultimately to safeguarding and improving the welfare of their citizens.

Creativity is what makes people, businesses and regions unique. It is the capacity to find innovative solutions to problems, to create new products or processes – from scratch or by combining existing elements – and by so doing contribute to the creation of economic value. As such, creativity is clearly linked to innovation and entrepreneurship so as to guarantee its translation into market opportunities. In the context of a globalising world, where many regions and countries are no longer able to compete on the basis of cost minimisation or efficiency and are therefore forced to redefine their economic strategy and find new competitive advantages, this entrepreneurial creativity has become key.

The object of this report is to provide a well-founded view of where the DC regions stand in the creative, knowledge-based economy. It starts by describing a three-stage model of economic development and all the ingredients needed for a successful move to the third stage – the innovation driven economy where creativity (translated into innovation, entrepreneurship and internationalisation) takes a central position in the economic model. All ingredients are then melded into a model of the creative economy that distinguishes input and output factors, as well as the systems to transform input into output.

Before analyzing the DC regions with respect to these factors, a more general presentation of the DC regions in terms of area, population and human development is given. In this the last is of particular importance as it allows us to perceive the DC network as one of two levels and two velocities. In particular, Karnataka and Shanghai (albeit to a lesser extent) are not yet fully confronted with the challenges that accompany the third stage of development as they rely much more than the remaining regions on the primary and secondary sectors. However, their economies are thriving and surely already show some elements of the creative, knowledge-based economy: think for example of the successful ICT-sector in Karnataka. The latter has witnessed a steady annual growth in GDP of 6.5% during the period 1994-2003; Shanghai's GDP registered an impressive growth of 13.6% in 2004. Hence these regions are progressing at a faster pace and have been attracting much foreign attention lately.

Chapters four to ten of this report analyse the performance of the DC regions in terms of a selection of indicators relating to the output of the creative economy as measured by, for example, GDP growth and job creation. A first essential input factor is population and human capital, a second is the overall regional environment as measured by hard as well as soft location factors, and the creative processes of innovation, entrepreneurship and internationalisation. In addition, for each of the DC regions a sector analysis shows the importance of knowledge intensive and creative industries, as these activities are considered to have the most potential for contributing to economic growth in the future.

When drawing up this analysis we were confronted with limited data availability and/or comparability of data on some regions. First, we were forced to exclude Karnataka and Shanghai from the empirical benchmark, partly due to limited data. However, some good practices in both regions will be highlighted throughout the report. Second, when data were available, it was not always possible to compare them, e.g. between the North American and European regions. Consequently, some indicators are limited to the European DC regions. Third, not all indicators were available at the regional level. As a result national data are presented for some indicators. We hope that in the future a more extensive collaboration between the DC regions will result in these data limitations diminishing. Moreover, it was impossible to find the ideal indicators for some of the input, processing and output factors. Hence we do not claim to have composed an exhaustive list of indicators. Also, one has to interpret all data shown in this report carefully. First, a low score on one of the indicators may provide evidence not of negligence, but of efficient use of available resources. Second, high scores on both input and output indicators pose a question of causality: does a high level of input lead to a high level of welfare, or is it the other way around?

Nevertheless, we believe that this report has succeeded in its aim of giving a first in-depth impression both of the achievements of the DC regions within the context of the creative, knowledge-based economy so far and of the challenges that remain to be taken up.

2 REGIONAL ECONOMIC DEVELOPMENT AND THE CREATIVE ECONOMY[1]

2.1. Globalisation and regional development

In the last few decades the world has seen considerable structural changes in commerce and trade. Because of globalisation, competition is no longer restricted to the local or regional area. The reduction in tariff and non-tariff barriers together with the rise of information and communication technology and decreasing transport costs have made global trade grow exponentially.

In this globalizing world, firms are looking for the optimal location on a global scale, taking into account price and availability of materials, commodities and human capital. Until recently it is mainly labour intensive production activities that have moved from Western to Eastern Europe or to other continents, primarily Asia. Lately other activities like services, R&D and distribution have followed the same trend. This evolution poses Western economies for new challenges: competition based on costs and prices is no longer feasible. Western economies have to look for other competitive advantages. The creative, innovation driven economy – also referred to as the knowledge-based economy – is presented as the pathway to follow. Its importance has frequently been brought into prominence at many different supranational (OECD, European Union,...), national and regional levels. In Flanders too, this need to move from a cost oriented to an innovation oriented economy has already been pointed out in several studies (De Backer and Sleuwaegen, 2003; De Backer and Sleuwaegen, 2005a).

At the same time an evolution seemingly opposite to globalisation has occurred, namely regions gaining importance. This is seen at many different levels: interest in federal state models has increased, in several countries (e.g. Belgium) more competences are being transferred from the national to the regional level, in 1994 the Committee of the Regions of the European Union was established, people are more aware of their regional identity, traditions, language,...

How can regions respond to the trend of globalisation so as to consolidate their competitiveness and sustain their current economic growth[2], or rather, increase it? A possible answer to this question can be given by determining the decisive factors in economic growth. These are directly related to the stage of development that an economy is in.

2.1. Regional development: a staged model

The question why some regions grow fast while others stagnate has always been a central issue in economic theory and research. On the whole, three large movements – classical, neoclassical and endogenous – can be distinguished. The development of economic theory through time has coincided with the increasing complexity of (Western) societies. Hence these movements correspond to different stages of economic development.

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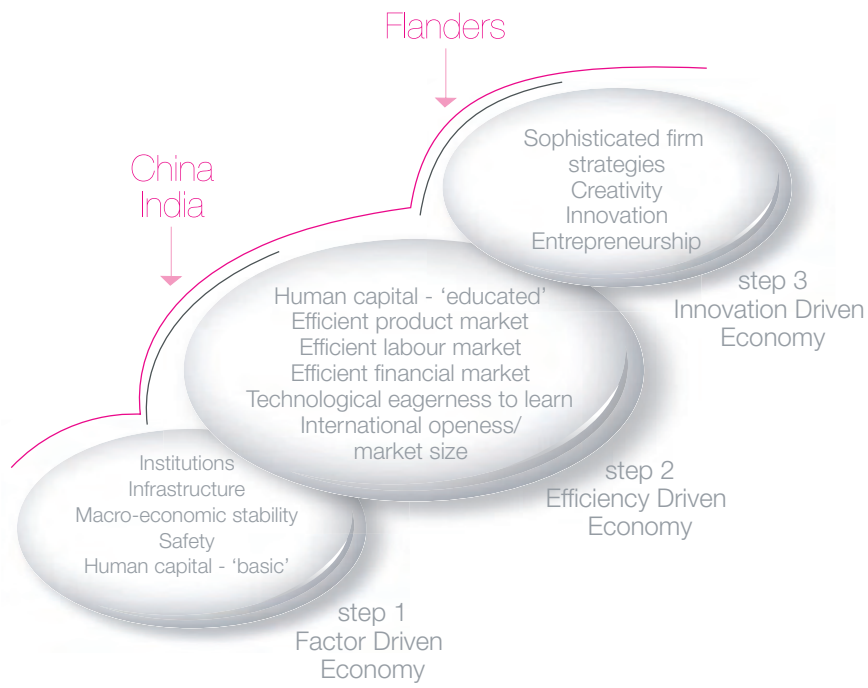
[1] / The authors would like to thank André Spithoven, Nathalie Moray and Bart Clarysse for their contributions to paragraphs 2.3 and 2.4 on regional innovation systems and learning regions.

[2] / For a more comprehensive analysis we refer to De Backer and Sleuwaegen, 2005b.

→ Figure 1 A staged model of development



Source: De Backer and Sleuwaegen (2005b), based on Global Competitiveness Report 2004-2005

The classical theory of economic development, represented by Adam Smith, John Stuart Mill and Karl Marx among others, corresponds to the first stage of development, the "factor driven economy". In this stage of development economic growth is primarily the result of the greater use of low cost production factors (labour, land,...). Countries and regions mainly produce standardised goods and services that have been developed somewhere else. The minimum preconditions needed to bring this production about are a sufficiently developed infrastructure and institutional environment, adequate macro-economic stability and safety, and a sufficiently large labour force (basic human capital). In past decades Western economies largely lost low-technology manufacturing activities to developing countries - primarily in Eastern Europe and Asia - who used this competition strategy to carve out a position in global trade.

In the second stage of development, corresponding to the neoclassical movement, the economy is oriented towards efficiency increases in the production of less standardised goods and services (the "efficiency driven economy"). Product, labour and financial markets work more efficiently and the active population is well educated, which induces technological inquisitiveness. Efficiency is further enhanced by a greater openness to international markets, which makes it possible to benefit from opportunities of scale. Productivity growth is still barely influenced by higher prices. This has to a large

degree been the competition strategy of Western economies during the 20th century, as they could no longer compete on the basis of price, due to the relative high cost of production factors compared to countries and regions in the first stage of development and were faced with shifts of activity to lower-income countries.

At the moment however, most Western economies are confronted with declining opportunities to increase efficiency as the limit of technological possibilities approaches. Second, they have to compete not only with developing countries in the first stage of development, but also more and more with lower-income countries with particular industries that have clearly moved to the second stage, e.g. ICT in India or the electronics sector in China. These lower-income countries produce more efficiently than before, they have an educated population and make increasing use of technology, but production costs are still far lower than in Western economies. The latter are once again forced to adapt their competition strategy and look for another approach, as they can no longer compete on either low cost or efficiency.

Western economies should move forward to the third stage of development - the “creative economy” - in the third movement of economic theory. This movement – also referred to as new growth theory – recognizes the role of knowledge and technology in driving productivity and economic growth. In other words, globalisation has shifted the comparative advantage of high-cost locations to creative and knowledge-based activities in which investments in research and development, education and training and new managerial work structures are key. The central focus should be on quality, creativity and innovation. This means companies will have to adapt their organisational structure and look for unique strategies in the fields of marketing, distribution, R&D,... Moreover, policies should also be oriented towards this new model of economic growth.

In each of the three stages of economic development mentioned above different primary determinants of economic growth can be defined. This implies that the critical success factors for economic growth in developing countries differ significantly from these in developed countries.

Clearly moving towards the next stage takes time. During such transition phases countries and regions should adapt their economic model to new and more sophisticated ways of producing and competing, which does not mean that previous determinants of economic growth become meaningless and unimportant. However, if more sophisticated factors of economic growth receive too little attention, the step to the next stage may not be taken – or not fast enough. Moving forward to a new phase of development is necessary to sustain economic growth and increase prosperity. By not doing so, a country or region risks a decline in welfare, due to deteriorating competitiveness in comparison to regions who do.

2.3. The creative economy: what?

The preceding section shows the importance for Western economies of moving forward in order to strengthen their competitive position and maintain their welfare. They are confronted with the challenge of taking the step to the third stage of economic development, in other words of transforming their economies into creative ones in which entrepreneurial creativity is the predominant competitive factor.

In an economic perspective, creativity is understood to mean the generation of ideas that are the basis of innovation, new economic activities and internationalisation. The most important characteristic of ideas is that they can be used more than once in different environments and that they do not face diminishing returns. Ideas often induce more ideas, by improving existing ones or producing new combinations. Innovation is the process of turning new ideas into new products or procedures that lead to productivity gains. Furthermore, the development of new organisational structures, new markets and new natural production factors can equally be considered innovation. Entrepreneurship is needed to tailor these efforts to innovate to market opportunities, so that market supply is tuned to demand. And as the regional market is often too small for firms to operate on an optimal scale, internationalisation of activities is a necessary third process in the creative economy.

To generate economic growth it is clear that all three creative processes – innovation, entrepreneurship and internationalisation – need to be in constant interaction. Innovation without the necessary link to entrepreneurship and internationalisation is not likely to lead to economic growth, as ideas are not translated to the market. The combination of innovation, entrepreneurship and internationalisation is what we call entrepreneurial creativity, the major source of economic growth in the creative economy. Given the predominant role of the creation, diffusion and use of knowledge in translating creativity into innovation, entrepreneurship and economic growth, such an economy may also be referred to as a knowledge-based economy.

Extensive literature is devoted to the definition and scope of the knowledge-based economy. The OECD (1996) defines it as an economy that is directly based on the production, distribution and use of knowledge and information. The knowledge-based economy may also be referred to as one in which the use of knowledge in interactive relations between all market participants is of primary importance across the whole economic process from ideas to end product, not only in industrial manufacturing sectors but also in commerce and services (Raspe et al., 2004). The common denominator of all definitions on the knowledge-based economy is that knowledge is perceived as its most important raw material, since it plays a major role in the creation of added value and employment growth.

In general, knowledge can be defined as the content and skills (creativity, eagerness to learn,...) needed to perceive and solve problems, for example by collecting and selecting information[3] (Raspe et al., 2004). As far back as 1966 Polanyi made a distinction between codified and tacit knowledge. Codified knowledge means standardised, explicit information and knowledge, which can usually be passed on to others formally and systematically. With modern information and communication technologies diffusion costs of codified knowledge are relatively low. All codified knowledge can now be transmitted over long distances, which makes users less restricted in space and time (OECD, 1996). As more and more knowledge becomes codifiable and accessible thanks to information technology, the remaining non-codifiable part gains significance (Soete and ter Weel, 1999).

Whereas information tends to be abundant, the capacity to use it in meaningful ways is scarce. Tacit knowledge in the form of skills needed to handle codified knowledge is more important than ever in labour markets. Skills in selecting relevant and disregarding irrelevant information, recognising patterns in information, interpreting and decoding information as well as learning new skills and forgetting old ones are in increasing demand (OECD, 1996). Tacit knowledge is (often subconsciously) embedded in people and is mostly non-explicit, context specific and difficult to formalise. Reproduction of tacit

[3] / The differences between data, information and knowledge are not well-defined. Furthermore, the literature shows no agreement on the form and direction of the relation between the three concepts. However, the following general distinction can be made. Data are a collection of observations, measurements or factual material in the form of numbers, words, sounds or images. They are raw material with no meaning in themselves from which information can be deduced. Information mainly consists of relatively unstructured data and statements with content. Knowledge refers to the application and use of this information, which requires more processing and understanding.

or personal knowledge is expensive as learning takes time and effort (Raspe et al., 2004). Since the transfer of (tacit) knowledge is above all linked to personal, human interaction, geographical proximity is of primary importance – despite the ongoing globalisation which is said to be making the world smaller. Furthermore, it is impossible for a large amount of knowledge to be acquired within a (small) company; rather it has to be build up through formal and informal networking (Jacobs, 1999). This makes the creative economy a networking economy.

Since the creative economy emphasizes all types of skill, Lundvall and Johnson (1994) prefer the concept of 'learning economy', where people have to obtain new skills and new knowledge in order to respond to changes quickly. Here, continuous learning of codified information as well as the skills needed for both individuals and businesses to make use of it is essential.

Given that the creative economy reserves a crucial role for knowledge and skills which cannot be costlessly transferred around the globe and that Western economies possess a highly educated work force combined with a vast (technological) store of knowledge, the creative economy represents a real opportunity to maintain and enhance their competitiveness. Moreover, regions can play a key role in this creative economy.

Richard Florida sees regions as a key element in globalised knowledge-based capitalism. Regions have evolved into centres for knowledge creation and learning. Florida terms these regions as 'learning regions' because they offer an environment which enables technology transfer and knowledge flows and thus enhances the learning process considerably (Florida, 1995). Table 1 shows the main features of the learning region.

→ Table 1 | Features of learning regions

Features	Mass production region	Learning region
Basis of competiveness	Comparative advantage based on: • natural resources • physical labour	Sustainable advantage based on: • knowledge creation • continuous improvement
Production system	Mass production • physical labour as source of value • separation of innovation and production	Knowledge based production • continuous creation • knowledge as a source of value • synthesis of innovation and production
Manufacturing infrastructure	Arm's length supplier relations	Firm networks and supplier systems as sources of innovation
Human infrastructure	• low-skill low-cost labour • Taylorist work force • Taylorist education and training	• knowledge workers • cont. improvement of human resources • cont. education and training
Physical and communication infrastructure	Domestically oriented physical infrastructure	• globally oriented physical and communication infrastructure • electronic data exchange
Industrial governance system	• adversarial relationships • command and control regulatory framework	• mutually dependent relationships • network organisation • flexible regulatory framework

Source: Florida (1995)

The shift of manufacturing from a relatively rigid mass production system aimed at economies of scale toward a knowledge-based service economy has major implications in various respects. Central to this development is the synthesis of creative intellectual and physical labour, uniting innovation and production. The human mind has become the main source of value.

2.4. Ingredients of the creative economy

Traditionally the significance and scale of the creative or knowledge-based economy is measured primarily by technological innovation and the educational level of the active population. However, the creative economy consists not only of R&D and technological innovation in industrial manufacturing, but also of non-technological innovation in commerce and services. Hence, the creative economy has to be interpreted in broader terms.

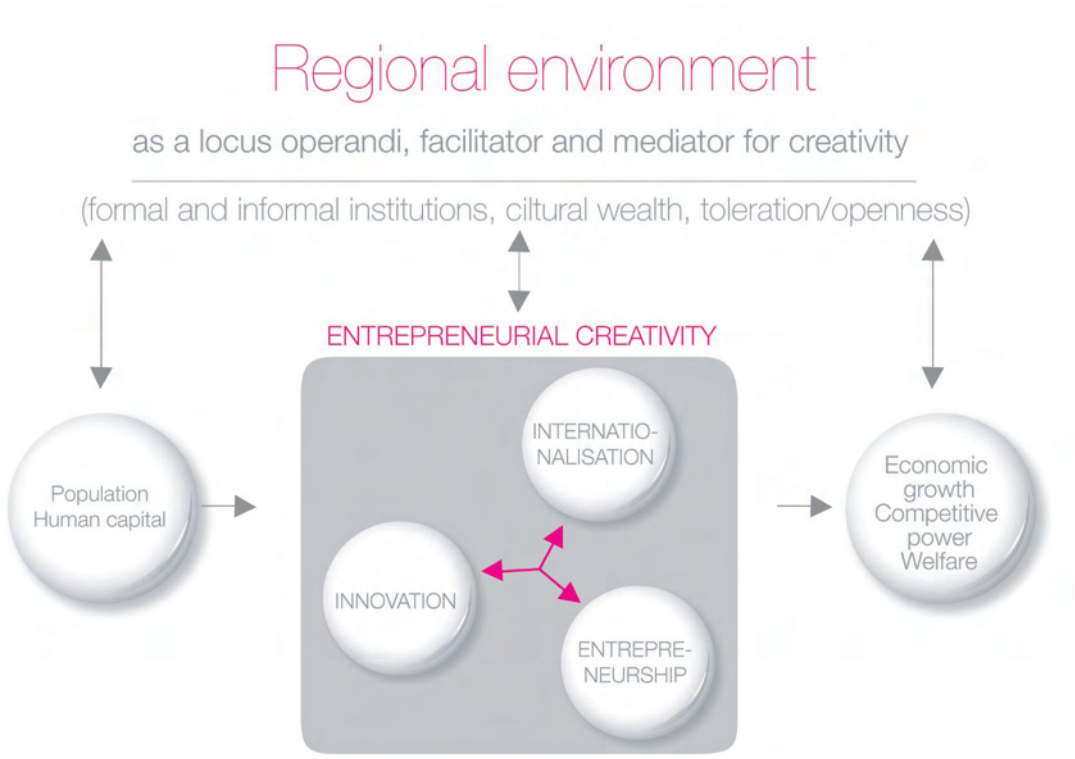
Following the Dutch planning office 'Ruimtelijk Planbureau Nederland', four important characteristics of the creative, knowledge-based economy can be discerned (Raspe et al., 2004, p.20):

- an economic and institutional regime that promotes the efficient creation, distribution and use of knowledge;
- an effective innovation system consisting of research institutions, universities, companies and other organisations and supported by policy makers that can translate knowledge to meet local requirements and hence create new knowledge;
- information and communication infrastructure that supports the dissemination of information;
- a well-educated active population that efficiently acquires, creates, disseminates and uses knowledge.

This shows that the creative economy cannot be captured as one single aspect or dimension. On the contrary, when assessing a country or region's position in relation to the creative economy correctly, the diversity of elements involved implies a multidimensional model. This multidimensional aspect of the creative economy can also be found in Florida's work on the creative class (2002) where he describes the broad social, cultural and geographic milieu conducive to all kinds of creativity as one of the three institutions of the creative economy, alongside new systems for technological creativity and entrepreneurship and new and more effective models for producing goods and services.

The figure below illustrates the complex relationship between the population of a region, its (institutional) environment, its creative potential and its economic performance.

→ Figure 2 The creative economy



2.4.1. Human capital

A first indispensable input factor in the creative economy is the presence of high quality education, as knowledge and education are intrinsically linked. Education provides skills to generate knowledge and contributes to the flexibility of the active population needed to deal with changes. Furthermore research shows a positive relationship between education and economic growth (Barro, 1991; OECD, 2001a), although the direction of this relationship is not unequivocal: high standards in education are not only the cause of high standards in living, but also the result (Bils and Klenow, 2000). A rich country may spend more on education, and thereby obtain better educational attainment. In other words, education and economic growth are intertwined.

Educated individuals not only have to be trained, they also have to be recruited and their knowledge and skills have to be used in the most effective way within businesses. After all, knowledge does not in itself contribute to economic growth (OECD, 2001a). The effectiveness of investment in human capital is thus both dependent upon the functioning of the labour markets and the organisation of production within enterprises (Rees, 1997).

With human capital, two different stages can be discerned. First, educational attainment before entering the labour market is important. The higher the level of educational attainment, the more people

can be assumed to have strong abilities to learn and to create new knowledge. Knowledge intensive businesses, whose performance in recent years has on average exceeded that of the economy, may be expected to choose to locate in regions where the knowledge they need is available, so a region with high educational attainment is more attractive. However, educational attainment is by no means a sufficient condition for strong economic performance and high welfare; firms and organisations may not make efficient use of the potential knowledge and skills available in the region (OECD, 2001a). Second, life-long learning has recently gained importance, as it helps people to make themselves familiar with new knowledge, acquire new skills and adapt to changes in society. This may involve retraining or extra training, or internal and external on-the-job-training. In addition, it may also refer to 'learning-by-doing' and 'learning-by-interaction', where skills, competences and abilities are acquired by taking part in economic processes.

2.4.2. Regional environment: hard and soft location factors

Besides a well educated, creative population, that possesses all the skills necessary to handle information and adapt to changes, entrepreneurial creativity is also affected by the (institutional) environment, for example by the influence it exerts on all factors determining location decisions by companies or decisions by individuals to start their own businesses.

Although literature about regional development and creativity increasingly underlines the importance of 'soft' location factors, traditional or 'hard' ones remain important and in many cases even decisive. These are all the factors relating to infrastructure, such as industrial sites, buildings and telecommunication, together with labour costs, laws and regulations of all kind, tax burden, service quality of local, regional and national authorities, etc.

Notwithstanding the fact that the sample of companies was too small to be statistically representative, a survey conducted by the Dutch Spatial Planning Office (Ruimtelijk Planbureau Nederland) in 2004 into the factors affecting companies' location decisions underlined the abiding importance of traditional location factors. Key factors are accessibility by road, followed by accessibility for the customer, availability of adequate personnel, telecommunication infrastructure and prestige of the building. Furthermore, knowledge intensive firms seem to value telecommunication infrastructure and the availability of adequate personnel more highly than non-knowledge intensive firms, whereas for the latter loading and unloading infrastructure and labour costs are more important.

Florida was the first to draw wide attention to the importance of 'soft' location factors with his 'creative capital theory' (2002). According to this, a city or region wishing to enhance economic performance and welfare for its residents should try to attract creative, highly skilled residents who will in their turn attract knowledge intensive firms. Here the secret of a city or region's success is its atmosphere, as the 'creative class' attaches importance to an environment that is pleasant to live and work in, diverse and multicultural, with an open-minded, tolerant mentality, easily accessible facilities and a thriving cultural scene.

Hard and soft location factors listed above may to a large extent be seen as coinciding with formal (law, regulations, institutions,...) and informal social institutions (standards, values, attitudes,...) respectively. Both formal and informal institutions influence economic growth, as higher quality institutions decrease transaction costs and improve economic efficiency.

Informal institutions, often referred to as social capital, may be less visible, but this does not mean that they cannot have a far-reaching impact on social and economic life. Social capital or the lack of it may affect educational attainment and individual life-long learning. A society may, for example, lack a tradition of adult education, children may not be stimulated sufficiently to pursue post-compulsory education, conservative management styles may attach little importance to on-the-job-training, etc. Furthermore, informal institutions largely influence the functioning of networks, which play an important part in the distribution and use of knowledge and innovation. For example trust and non-opportunistic behaviour reduce uncertainty between network actors and as such foster stable and reciprocal interaction.

2.4.3. Regional innovation systems

As knowledge in itself cannot enhance competitiveness directly, advances in technological and organisational knowledge have to be absorbed and applied by businesses: ideas and creativity need to find their way into innovations and entrepreneurship.

Innovation is at the core of many policy intentions and documents at different levels. For example, the European Union stated in Lisbon in 2000 that it should "stimulate innovation to become the most competitive and dynamic knowledge-based economy of the world". It is important to stress that innovation includes not only technological innovation but also non-technological innovation such as that in services or organisational or managerial innovation. Innovation can thus assume many forms, including incremental improvements to existing products, application of technology to new markets and uses of new technology to serve an existing market.

In the past, innovation was assumed to be the outcome of a linear, straightforward process that started with new scientific research, which was followed by the successive stages of product development, production and marketing, and ended with the successful sale of new products, processes and services. In a creative economy, where social interaction and networking play an important role, the linear process of innovation is the exception rather than the rule. In this view, ideas for innovation can stem from many sources, including new manufacturing capabilities and recognition of new market needs. Furthermore, the process of innovation requires substantial communication back and forth between different actors in an innovation system, e.g. product development, manufacturing and marketing departments of firms, research laboratories, academic institutions, particular government services and consumers. Other actors may be organisations who foster the development, diffusion and use of knowledge by, for example, providing education and training, venture capital or other forms of business service (OECD, 1996). The numerous interactions between all actors make the innovation system anything but a linear process.

The nature of collaboration and interaction depends upon several characteristics of the network. It can be structured vertically (e.g. between firms and their suppliers or sub-contractors) or horizontally (e.g. between firms in a joint venture), interaction may be more or less formalised, etc. Furthermore, quality of interaction depends profoundly upon existing social institutions. Also, the extent to which interactive learning and exchange of knowledge between actors in an innovation network takes place depends to some degree on their spatial proximity, since geographical nearness facilitates collaboration and human interaction. This finding may be of special importance to regions.

In the nineties the first mature concept of 'national innovation systems' was formulated by the evolutionary school of thought which views the economy as systemic and dynamic in nature (Freeman, 1987; Lundvall, 1992; Nelson, 1993). The whole idea behind 'national' innovation systems is that this concept tries to explain why territorial or spatial differences in innovative performance exist in a world that is characterised by globalisation. Following this, the OECD has devoted much effort to promoting the notion of national innovation systems (OECD, 2001b and 2001c).

As science and technology policy in some European countries like Belgium, Germany and the United Kingdom is organised in a decentralised way, the regional dimension increasingly came into view. Regional innovation systems have vested a reputation in the literature on science and technology. As Cooke (2004) reported, more than 200 studies have appeared on this subject. The general idea behind it is to study 'systems' operating at different spatial levels in which knowledge-generating organisations interact with knowledge-receiving organisations in order to commercialise this new knowledge and hence promote development. One would expect that a process of adaptation causes convergence between the different economic spheres, yet in the realm of R&D and innovation the differences remain significantly persistent. Central to this now widely accepted concept is the notion that conventions and the role and impact of institutions are territorially bound. From this it is usually inferred that a decentralised R&D and innovation policy can support regional economic development. Table 2 gives an overview of the main differences between national and regional innovation systems.

→ Table 2 National versus regional innovation systems

Features	National innovation systems	Regional innovation systems
Inter-firm relationships	Market and hierarchical Authoritarian relationships Emphasis on competition Arm's lenght supplier relatiionships	Network economics Web systems Supplier chains as source of innovation Cooperation and trust
Knowledge infrastructure	Formal R&D laboratories Focus on process R&D Federal R&D laboratories Focus on defence	University research Focus new product R&D External sources of knowledge Local R&D spillovers
Community and the public sector	Emphasis on federal level Paternalistic relationship Regulation	Emphasis on regional level Public-private partnerships Community, cooperation and trust
Internal organisation of the firm	Mechanistic and authoritarian Separation of innovation and production Multi-divisional firm	Organic organisation Continuous innovation Matrix organisations
Institutions of the financial sector	Formal savings and investment Formal financial sector	Venture capital Informal financial sector
Physical and communication infrastructure	National orientation Physical infrastructure	Global orientation Electronic data exchange
Firm strategy, structure and rivalry	Difficult to start new firms No access to knowledge	Easy to start new firms Inexpensive access to knowledge Entrepreneurship is crucial

Source: Acs, de la Mothe and Paquet (2000)

Comparison of Table 1 and Table 2 reveals that both perspectives – regional innovation systems and learning regions – focus on similar features. First, knowledge production and innovation are believed to be keys to developing and sustaining a competitive advantage at both organisational and regional level. Second, network forms of organisation embedded in a particular region have replaced the landscape of hierarchically or geographically structured organisations based on markets. The focus is on developing and maintaining mutually dependent, win-win relations between a variety of actors: multinationals, knowledge centres and universities, SMEs and government agencies. Regional anchoring of these actors should provide maximum opportunity for achieving knowledge / R&D spillovers, giving maximal leverage to the challenges of globalisation and contributing to regional development. Third, both regional innovation systems and the learning perspective embody the essence of globalisation in their physical and communication infrastructure.

2.4.4. Entrepreneurship

The importance of entrepreneurship for achieving economic growth is widely recognized by both policy makers and economists. The European Commission stated that "The challenge for the European Union is to identify the key factors for building a climate in which entrepreneurial initiative and business activities can thrive. Policy measures should seek to boost the Union's levels of entrepreneurship, adopting the most appropriate approach for producing more entrepreneurs and for getting more firms to grow." (European Commission, 2003).

Entrepreneurship is essential to maintaining and enhancing the competitive strength of an economy. As long ago as 1942 Schumpeter spoke of "creative destruction". The entrance of a new firm into a particular market forces the incumbent firms to react by improving efficiency or introducing innovation. In addition, entrepreneurship contributes to job creation and hence to economic growth. In this respect new and small firms, rather than large ones, are increasingly seen as the major providers of new jobs (Audretsch, 2003).

However, the impact of entrepreneurship on economic growth is shown to vary with the development level of an economy. More specifically, the optimal level of entrepreneurship depends upon the stage of the economy's development. Deviations from this optimum have a negative effect on economic growth. An entrepreneurial level that is too low results in insufficient competition and stimulus to innovation, whereas an excessive level induces too many marginal firms to enter the market. In developed countries entrepreneurs and smaller businesses are more important for economic growth, while in less developed countries large companies play a more central role through economies of scale (van Stel, 2005).

Apart from the level of development, the impact and quality of entrepreneurship is also affected by surrounding elements such as legal certainty and the availability of sufficient risk capital. The latter may pose particular problems in some Western regions and countries. Flanders, for example, is characterised by a very high savings rate, but these resources are not sufficiently translated into new economic activities. Furthermore, average venture capital invested has increased in recent years, resulting in even more difficulty to find venture capital for smaller projects. Venture capital markets should accordingly be further developed as an alternative to bank lending, so that entrepreneurs can more easily find capital to finance their ideas. Also, risk sharing between public and private sectors can help to increase the availability of finance.

2.4.5. Internationalisation

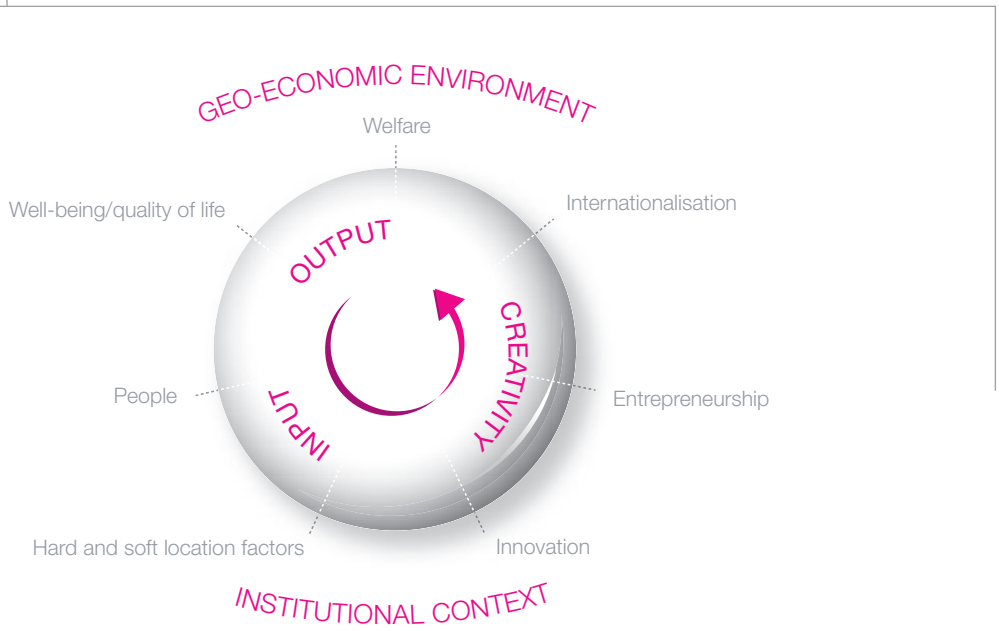
Entrepreneurs who bring innovative goods and services to the market, can benefit significantly from looking beyond the borders of their own region or country. Since knowledge can be 'consumed' many times by many people, this creates considerable export opportunities. Export and foreign investment are not only beneficial to the firm itself, but also to the home region, as firms that invest abroad contribute to more competitiveness. Since they are more directed towards international markets, they catch international tendencies and knowledge more rapidly. They also spread their risks more than firms that only have branches in their homeland (UNCTAD, 2005; Voka and Vlaams Economisch Verbond, 2005).

Besides export and investment abroad, it is equally important for regions to attract sufficient foreign investment themselves. Knowledge developed by foreign firms in their homeland is brought to the places where they invest and subsequently spills over to other (domestic) firms through suppliers, employees, etc. Moreover, such firms increase competition and force others to work more efficiently and more innovatively. International openness is thus the next prerequisite of the creative economy.

2.4.6. DC (Districts of Creativity) model

If a region acts to the best of its ability on all the above matters, this is likely to lead to superior economic performance. A region that exerts influence on the available human capital, creates the most favourable environment for creativity and doing business with a focus on both hard and soft factors, fosters innovation and entrepreneurship, and looks beyond its own borders to make maximum use of export opportunities, will strengthen its competitiveness and thus create more welfare for its residents. In turn, welfare can bring well-being to residents, can improve the quality of life. A region that can guarantee a good standard of living and a good quality of life to residents will be able to attract more people from the creative class (Florida, 2002) and more economic activity. This closed circle of elements that interact closely with each other is embodied in the DC model of the creative economy.

→ Figure 3 | DC model of the creative economy



The model identifies some prerequisites of maintaining and strengthening regional competitiveness in the creative economy. The input factors of the creative economy include a well educated active population, eager to learn and to adapt to new developments in (global) markets and an (institutional) environment that fosters the available creativity as much as possible. These input factors are translated into economic growth, welfare and well-being (the output of a creative economy) by means of entrepreneurial creativity: the processes of innovation, entrepreneurship and internationalisation. These creative processes are regarded as essential factors in the creative economy. It is clear that all the above factors do not interact with each other in a vacuum, but are influenced and shaped by the geo-economic environment and the institutional context in which the interaction takes place.

The DC model indicates some key elements in the creative economy. This is not to say that it should be treated as the standard for all regions wanting to upgrade their economy to the third stage of development. On the contrary, each region needs to create its own strategy, which has to reflect the details of its past and current circumstances. All regions have their own distinctive characteristics – e.g. their economic structures, their patterns of social and political relations and their culture embedded in everyday interactions – which interact in shaping future patterns of development and should on no account be ignored as they can help to define a unique competitive position.

However, when the question arises whether all regions are capable of achieving high economic growth on the basis of entrepreneurial creativity, it becomes clear that these same distinctive characteristics can hinder the successful development of the creative economy. A region is then said to suffer from path dependency. For example, social institutions, which are very difficult and time-consuming to change, may obstruct effective responses to the new competitive environment, a region's industrial structure (e.g. sectors, size of firms, number of players on one market,...) may not be adapted to the challenges of the creative economy, etc. As regards industrial structure, a region may opt to move away from existing sector-based structures by attracting new firms (which requires careful direction as the new firms have to be anchored in the region), or upgrade the existing structure.

Hence some regions may be more able than others to take the step to the creative economy. Here one can identify leading regions that set the agenda for the sectors in which they operate, regions striving to meet the challenges set by those leading regions and regions unable to change their production structure in the direction of more advanced and knowledge intensive activities (OECD, 2001a).

We believe that the DC regions that are no longer capable of competing on the basis of efficiency, let alone price, have the potential to become either leading creative regions or close followers, as part II of this report will indicate. It paints a picture of all DC regions' strengths and weaknesses in becoming creative, innovative and entrepreneurial economies offering high and sustained welfare to their residents.

3 THE GLOBAL DC NETWORK: DIFFERENT STAGES OF DEVELOPMENT

The DC network consists of 11 regions (10 full members and one associate member) spread over three different continents (Europe, North America and Asia) that recognise creativity, innovation and entrepreneurship as important and predominant factors in economic growth and welfare. Each of them has sufficient regional competences – primarily in the fields of economics and the labour market, but some also in areas such as science and education – to enable them to adapt their policy to the development of the creative economy. The diversity of the regions guarantees an open and creative mindset in an interactive global network.

To be able to see the benchmark of the next section in the right perspective, this section gives some general information on the area, population and human development of the member regions.

Quebec is by far the largest region with an area of more than 1.6 million km^2. Except for Karnataka (192,000 km^2), all other regions have an area of less than 100,000 km^2, Shanghai (6,000 km^2) and Flanders (13,000 km^2) are smallest.

Karnataka has the largest population (more than 52 million), followed by Shanghai (13.5 million). Given the combination of a very small area and the second largest population, Shanghai's population density is extremely high (2,133 people per km^2). All other regions have a population density of between 133 (Rhône-Alpes) and 444 people per km^2 (Flanders), except for Scotland (65 people per km^2) and Quebec (4 people per km^2). Over the last decade population has grown very fast in Karnataka (17.2%), whereas Scotland has experienced a slightly negative population growth (-1.28%) and the population of Nord-Pas-de-Calais has remained almost stable (0.89%). In the other regions population growth has varied between 2.64% (Lombardy) and 6.64% (Catalonia).

→ Figure 4 | The DC regions-general facts and figures

Source: European regions: Eurostat; Karnataka: Figures at a glance - Karnataka, Bangalore IT; remaining regions: regional statistical offices

To assess the current stage of development of the different member regions, the following paragraphs present some data on human development. Where regional data were not available, we have used national data.

Life expectancy at birth and infant mortality rate (the number of infants who die in the first year of life, expressed as a rate per 1,000 live births) give an indication of health care, health status and the more general well-being of a society. In addition, the infant mortality rate gives an indication of the effectiveness of preventive care and the attention paid to maternal and child health.

In all regions except Karnataka, life expectancy at birth is between 73 (Scotland) and 78 years (Shanghai) for men and between 79 (Scotland) and 84 (Catalonia) for women. Karnataka is the only region where life expectancy at birth is below 70 years (62 for men and 64 for women).

→ Table 3 | Life expectancy at birth, 2003

	Male	Female
Baden-Württemberg	77	82.7
Catalonia*	77.2	83.7
Flanders	76.9	82.3
Karnataka	62.4	66.4
Lombardy*	76.9	82.9
Maryland*	74.4	80
Nord-Pas-de-Calais	72.4	80.8
Quebec	76.8	82.1
Rhône-Alpes	76.7	83.5
Scotland	73.3	78.8
Shanghai	78.1	82.5

* : country data

Source: country data: Eurostat; Karnataka: India invites; remaining regions: regional statistical offices

The same applies to infant mortality: Karnataka is an outlier with more than 50 infant deaths per 1,000 births in comparison with an average of 4.8 deaths in the remaining regions (no data available for Shanghai).

→ Table 4 | Infant mortality, 2000

	Infant deaths per 1,000 births
Baden-Württemberg	4.3
Catalonia	3.5
Flanders	4.3
Karnataka	51.5
Lombardy	3.4
Maryland*	7.0
Nord-Pas-de-Calais	5.8
Quebec	4.7
Rhône-Alpes	3.9
Scotland	5.7
Shanghai	n.a.

* : country data

Source: European regions: Eurostat; Karnataka: Development outcomes, challenges and reforms, World Bank; Maryland: National Center for Health Statistics; Quebec: Statistics Canada Cansim

Literacy rate, which gives an idea of the available basic human capital, was 67% of the total population in Karnataka in 2001. In all other regions it may be regarded as approaching 100% of the population.

The share of the urban population varies from 68% in Baden-Württemberg to 97% in Belgium. In Karnataka, however, only 34% of the population lives in an urban environment.

→ Table 5 | Share of urban population, 2005

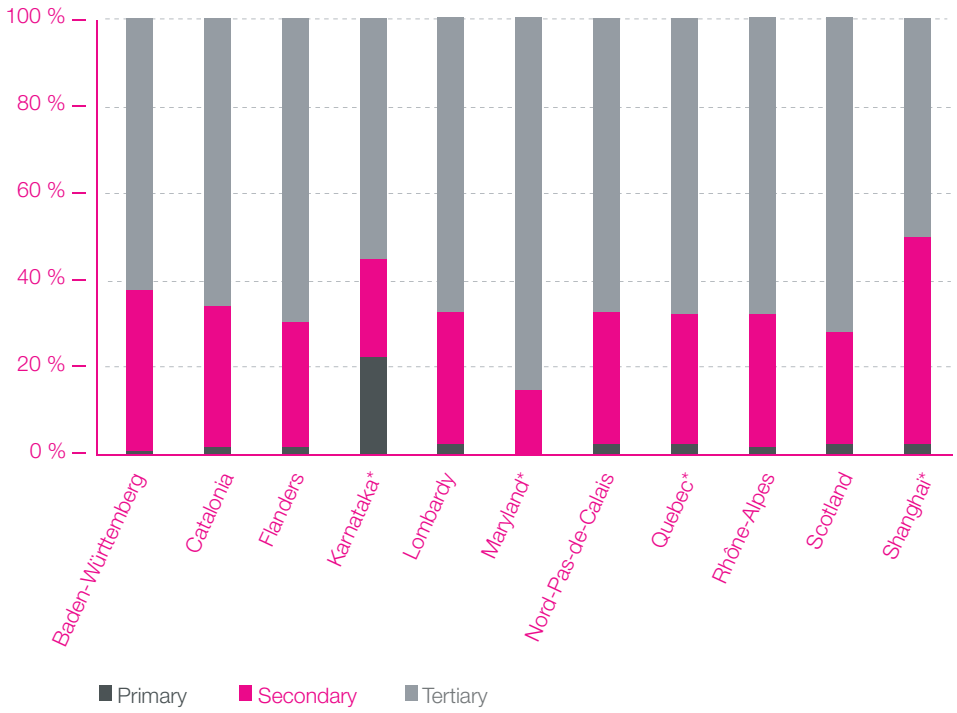
	Urban population (in %)
Baden-Württemberg	68
Catalonia*	76
Flanders*	97
Karnataka	34
Lombardy*	90
Maryland*	79
Nord-Pas-de-Calais	88
Quebec	80
Rhône-Alpes	79
Scotland	68
Shanghai	76

* : country data

Source: country data: Population Reference Bureau 2005, world population data sheet; Karnataka: Bangalore IT; remaining regions: regional statistical offices

Besides the geographical distribution of the population, what is also important in an economic context is the distribution of regional Gross Value Added over the primary, secondary and tertiary sectors. It is found that the higher the stage of economic development of a region, the more services become important in the economy and thus the larger the tertiary sector.

→ Figure 5 Sectoral distribution of Gross Value Added, 2002



*: Sectoral distribution of GDP instead of GVA. Since we want to give an indication of the relative importance of agriculture, industry and services, we believe that the differences between GDP and GVA do not change the picture.

Source: European regions: Eurostat; Karnataka: Directorate of Economics and Statistics; Maryland: Bureau of Economic Analysis; Quebec: Institut de la Statistique Quebec; Shanghai: UNEP, City of Shanghai Vital Statistics

Three important observations can be made. First, as the rural population in Karnataka accounts for 66% of the total population, the primary sector's share of GVA (23%) is more than ten times larger than in the remaining regions (mostly less than 2%). However, the importance of agriculture has been declining in recent years, mostly in favour of services. Second, in Shanghai industry still accounts for a large share of GVA, whereas the share of services is relatively small (even slightly smaller than in Karnataka). Shanghai's economy seems more dependent on industrial activities. Third, compared to the remaining regions the secondary sector in Maryland is remarkably small, while the tertiary sector is larger. This means that, on the premise above, Maryland has evolved more than others into a knowledge-based service economy.

Combining the regional data presented in this section with the staged model of development presented in Figure 1, it can be concluded that considerable differences in development still exist between Karnataka and Shanghai and the remaining DC regions. Especially in Karnataka, human development is lower and the economy is - although gradually changing - still to a relatively large extent based on the primary sector. Shanghai, on the other hand, is characterised by a strong industrial base. As the objective of this study is to evaluate the DC regions' performance in several aspects of the creative, knowledge-based economy, it has been decided to assess only those regions that can no longer compete on the basis of price or efficiency (the first and second stage of development) and are therefore forced to redefine their economic strategy and find new competitive advantages. We believe that Karnataka - and to a lesser extent Shanghai - are not yet confronted with this situation. Moreover, collecting data for both regions at a level that makes international comparison possible appeared very difficult for most of the topics in this study. Therefore they will not be included in the empirical benchmark. This does not mean that Karnataka or Shanghai do not yet manifest elements of the third stage of development - think for example of the thriving ICT sector in Bangalore.

Given considerations the remainder of this study will focus on the 9 European and North-American DC regions. We are aware that this selection largely neglects the unique global character of the DC network. Moreover, although Karnataka and Shanghai are considered to be still at a different stage of development, the other regions can still learn from both regions in various respects. Therefore, throughout this study some good practices from both regions will be discussed.

4 REGIONAL WELFARE

Maintaining or improving competitiveness is the economic driver for regions or countries worldwide. It is competitiveness that ultimately brings welfare to regions or nations and their populations. Regional competitiveness is defined as "the ability of a region to guarantee a high and ever increasing standard of living in a sustainable manner, coupled with a high level of employment". Regional competitiveness is the outcome of many factors and the extent to which these factors contribute to a region's competitiveness can change over time and differ between regions worldwide (cf. chapter 2).

This chapter will highlight the outcome of competitiveness in the different DC regions taking part in this study: to what extent have the regions been able to guarantee a high standard of living and have they been successful in the creation of jobs?

4.1. Regional wealth

The measure most frequently used to indicate the wealth of a region is GDP (Gross Domestic Product) per capita. It expresses the value of all products and services produced within a region, regardless of whether or not this has been produced by the inhabitants. To compare regional GDP levels across countries, corrections have to be made for the size of the region as well as for the difference in price levels. Therefore, GDP per capita converted using purchasing power parities (PPPs) is used[4].

With the exception of Nord-Pas-de-Calais, the 2003 GDP per capita (in PPPs) in all regions was well above the EU-25 average and even above EU-15 average. With PPPs 33,013 Maryland had the highest GDP per capita in 2003. Over the period 1998-2003 GDP at constant prices grew at an average annual rate of 3.3% and real GDP growth did not slow down after 2000 as was the case with all other DC regions.

The deceleration in economic growth since the millennium was indeed a general trend for all DC regions except Maryland, as well as for the whole EU. However, the economic downturn hit some regions more badly than others. Scotland in particular has seen a drastic deceleration in real GDP growth, with a negative average annual growth rate since the new millennium. In Flanders too, real GDP growth has been significantly lower since 2000, with an average annual rate far below 1% for the period 2000-2003. Other regions were still able to maintain a real GDP growth above 2% per year (Catalonia, Nord-Pas-de-Calais) over the same period.

Nevertheless, the European DC regions remain important economic areas within the EU-25. About 10.4% of total EU-25 population (1 Jan, 2003) lives within an area equal to 6.1% of that of the EU-25 and accounts for 12.5% of GDP (2003). Average annual real growth of GDP in the DC regions was on average comparable to the average annual real GDP growth in the EU-25 over the period 1998-2003 (2.25% against 2.24%). However, since 2000 other regions within the EU-25 (especially in the new Member States) have been catching up. Over the period 2000-2003 average annual real GDP growth within the EU-25 (1.44%) was significantly higher than the average in the DC regions (0.96%).

[4] / However, regional purchasing power parities are not being calculated. Consequently, official statistics on regional GDP in PPS make use of the national PPPs. Also in this study the reported data are conversions of GDP using national PPS.

→ Table 6 | GDP per capita, 2003

	GDP per capita (in PPS)	Average annual real GDP growth, 98-03	Average annual real GDP growth, 00-03
Baden-Württemberg	26,419.0	2.22%	1.02%
Catalonia	24,452.2	3.44%	2.75%
Flanders	24,651.4	2.20%	0.65%
Lombardy	29,660.1	1.23%	0.47%
Maryland	33,013.3	3.29%	3.29%
Nord-Pas-de-Calais	19,399.8	2.03%	1.80%
Quebec*	26,259.2	3.52%	2.36%
Rhône-Alpes	24,470.7	2.30%	1.38%
Scotland	25,195.4	2.36%	-1.35%
EU-15	23,300.0	2.20%	1.37%
EU-25	21,200.0	2.24%	1.44%

*: GDP per capita (in PPS) from 2002

Source: Eurostat, Statistics Canada, US Dept. of Commerce, conversion using Eurostat currency rates

Gross Domestic Product is determined by three main factors: the percentage of the population aged between 15 and 64, the employment rate and labour productivity. Labour productivity measures the value added generated by employees. The employment rate indicates the percentage of population between 15 and 64 who have a job.

In 2003 Lombardy was characterised by the highest labour productivity per employee, followed by Flanders. Baden-Württemberg, although having the second highest GDP per capita among the EU regions in this study, has a labour productivity remarkably lower than Lombardy and Flanders. However, this is compensated by an above average employment rate (69.8%). Nord-Pas-de-Calais' low GDP per capita appears to be caused by a combination of low labour productivity and a low employment rate. Although no data on labour productivity are available for Quebec and Maryland, the employment rate in both regions is above average. Moreover, in Quebec almost 70% of the total population is aged between 15 and 64. Given a GDP more or less in line with that of Baden-Württemberg, we might expect that labour productivity in Quebec will not be drastically higher than in that region. For Maryland on the other hand we can assume that labour productivity will be among the highest of all DC regions.

→ Table 7 | Determinants of GDP, 2003

	Labour productivity per employee (in pps)	emplyoment rate (in %)	Population between 15 and 64 year (in %)
Baden-Württemberg	57,548.3	69.8%	65.7%
Catalonia	54,572.7	66.6%	67.3%
Flanders	64,962.9	62.9%	65.8%
Lombardy	67,402.9	63.9%	68.9%
Maryland	n.a.	74.7%	67.7%
Nord-Pas-de-Calais	51,522.2	56.6%	66.7%
Quebec	n.a.	70.2%	69.5%
Rhône-Alpes	62,889.4	64.5%	60.3%
Scotland	54,800.2	72.3%	66.3%
EU-15	54,606.4	64.3%	66.4%
EU-25	50,550.5	62.9%	66.7%

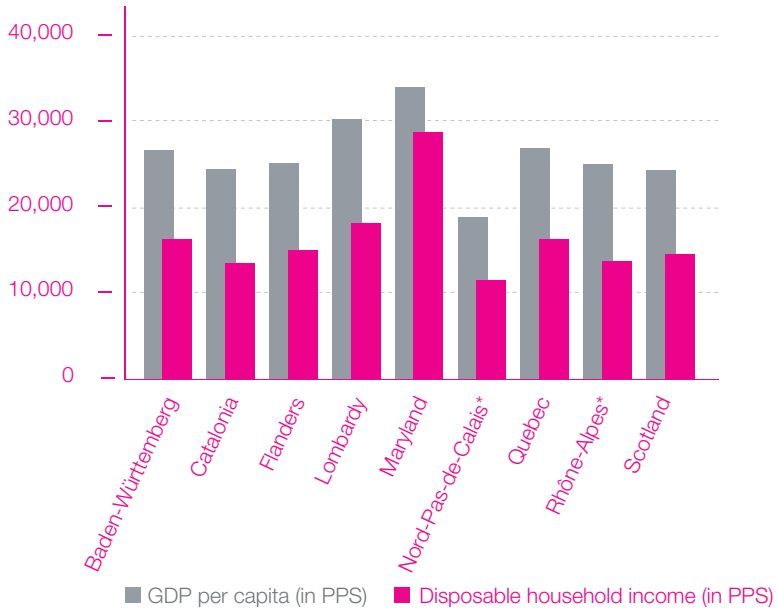
Source: Eurostat, VRIND

As regional GDP is calculated from an output perspective, GDP per capita of a region can differ significantly from the ultimate disposable income of the inhabitants of the region. Generally not all income from production remains within a region, due to interregional transfers. For example, some regions are characterised by a large inflow/outflow of daily commuters (e.g. Flanders, where many inhabitants commute to Brussels). Moreover, taxes and other redistribution instruments change the amount that inhabitants have at their disposal as well. Therefore when talking about the wealth or prosperity of a region, next to GDP one should also look at the income that inhabitants have at their disposal. The combination of both indicators gives a more balanced portrait of regional wealth.

Figure 6 illustrates the clear difference between GDP produced in the regions versus the disposable income of the population living in the region. On average, the disposable income per capita in the DC regions[5] was only 65.3% of GDP per capita in 2002. This difference is the result of differences between place-of-production and place-of-residence on the one hand and state interventions in the form of taxes and transfer payments on the other. Only in Maryland is the gap between GDP and disposable income limited: disposable income per capita is 84.6% of GDP per capita, a proportion well above the average.

[5] / Data about disposable household income per capita in Nord-Pas-de-Calais and Rhône-Alpes are not available for 2002. Therefore, both regions have been omitted in calculating the average.

→ Figure 6 | Disposable household income per capita (in PPS) versus GDP per capita, 2002



*: disposable household income data for 2001

Source: Eurostat, Statistics Canada, US Dept. of Commerce, conversion using Eurostat currency rates

4.2. Employment

Besides the wealth of a region, employment is a second key aspect in assessing regional competitiveness. One can only speak about sustainable competitiveness when regional wealth is coupled with a high level of employment.

Over the period 1999-2003 the nine DC regions in this study have created more than 1.4 million new jobs in total. Looking specifically at the EU regions in the network, they have created more than 15% of all new jobs in the EU-25. Given the fact that those regions accounted for 10.3% of all jobs in the EU-25 in 1999, this implies that on average they have strengthened their position in the EU labour market. However, strong differences in job creation performance exist among the regions (see Table 8). Whereas in the period 1999-2003 employment in Nord-Pas-de-Calais grew on average by over 3.5% per year, job creation in other regions was well below 1% (e.g. Flanders, Rhône-Alpes).

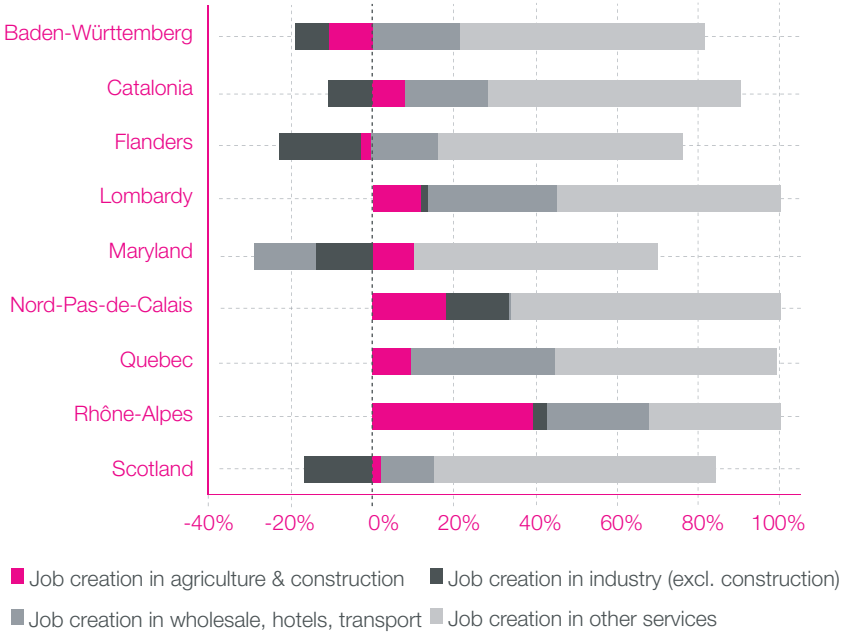
→ Table 8 | Employment (in 1,000's), 1999-2003

	Employment, 1999 (in 1,000's)	Job creation 1999-2003	Employment, 2003 (in 1,000's)	Average annual employment growth 99-03
Baden-Württemberg	5,148.7	189.4	5,338.1	0.92%
Catalonia	2,719.1	172.0	2,891.1	1.58%
Flanders	2,298.8	79.0	2,377.8	0.86%
Lombardy	3,832.6	231.1	4,063.7	1.51%
Maryland	2,346.7	87.8	2,434.5	0.94%
Nord-Pas-de-Calais	1,324.6	197.0	1,521.6	3.72%
Quebec	3,357.2	292.7	3,649.9	2.18%
Rhône-Alpes	2,219.1	55.3	2,274.4	0.62%
Scotland	2,264.2	122.7	2,386.9	1.35%
EU-15	163,646.0	7,287.0	170,933.0	1.11%
EU-25	192,489.0	6,848.0	199,337.0	0.89%

Source: Eurostat – ESA95, Labor Force Survey, Statistics Canada, Maryland Dept. of Labor, Licensing and Regulation

The sectoral distribution of the employment evolution follows the same trend in all regions except Rhône-Alpes, with limited job creation or even decline in agriculture, construction and industry on the one hand and strong job creation in services on the other. Out of total net job creation in all regions over the period 1999-2003, 99% has been in services! More specifically, 77% of net job creation has been in services other than wholesaling, hospitality trade (hotels/restaurants) and transport. These actually accounted for more than 100% of the net number of jobs created in three regions - Maryland, Flanders and Scotland, i.e. the creation of jobs in other services has been larger than the net loss in jobs in other categories of industry. In Baden-Württemberg and Flanders services have even been the only source of job creation over the period 1999-2003. In both agriculture/construction and manufacturing there was a net loss of jobs.

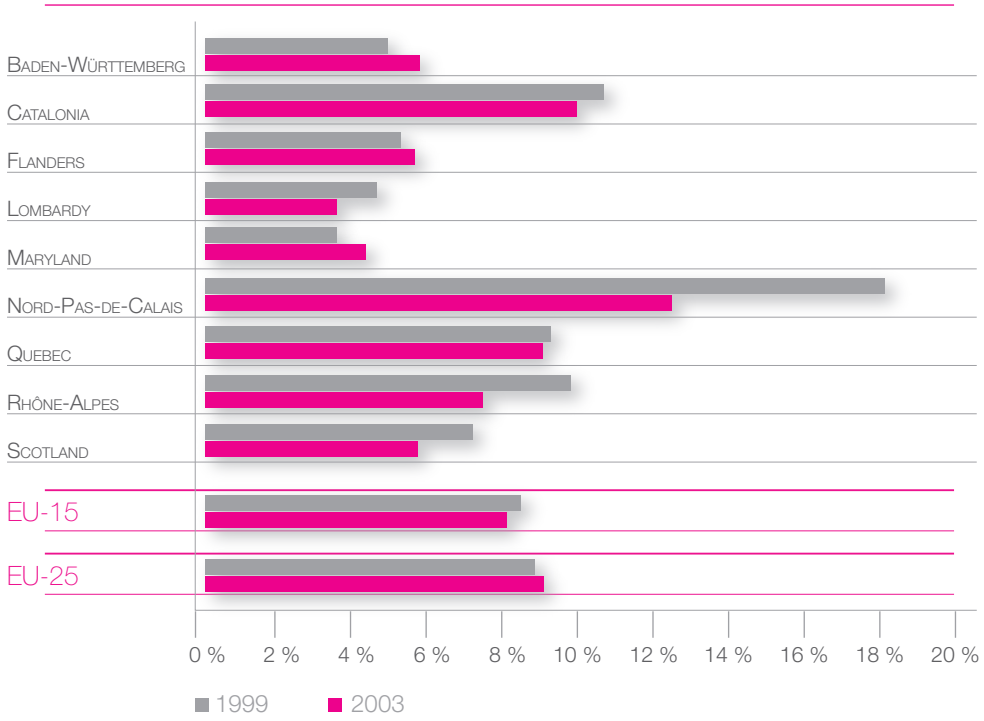
→ Figure 7 Sectoral distribution of job creation, 1999-2003



Source: Eurostat – ESA95, Labor Force Survey, Statistics Canada, Maryland Dept. of Labor, Licensing and Regulation

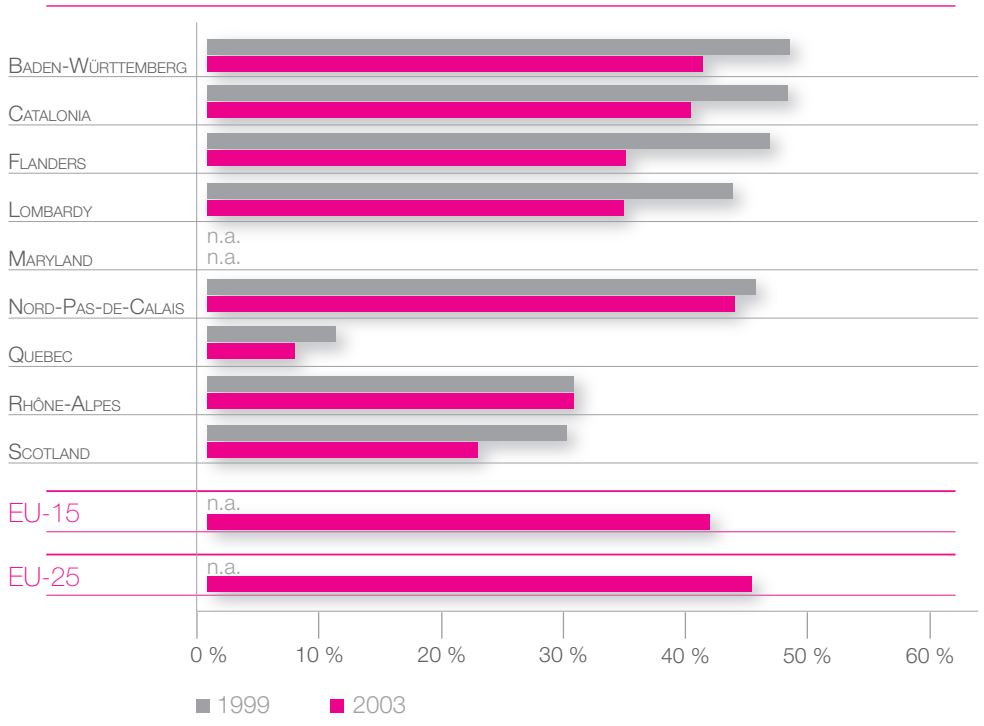
Despite the 1.4 million new jobs that have been created in the DC regions over the period 1999-2003, on average 7.2% of the labour force in the regions was unemployed in 2003. This is a considerable improvement compared to 1999, when an average unemployment rate of 8.3% prevailed. Compared to the EU regions (both EU-15 and EU-25), the labour market in the DC regions has evolved in a far more positive way. Only in Maryland, Flanders and Baden-Württemberg has the state of the labour market deteriorated over the period 1999-2003. Moreover, in some DC regions the unemployment rate remains alarmingly high. Nord-Pas-de-Calais in particular still faces an unemployment rate far above the average, although a remarkable improvement has taken place over the period 1999-2003. Catalonia too is faced with double digit unemployment which it has not been able to reduce as drastically as Nord-Pas-de-Calais.

→ Figure 8 Unemployment rate (% labour force + 15 yr), 1999 versus 2003



Source: Eurostat, Statistics Canada, Maryland Dept. of Labor, Licensing and Regulation

→ Figure 9 Long term unemployment (as a % of total unemployment)



Source: Eurostat, Statistics Canada

Figure 8 also shows that unemployment in Quebec was above 9%, in both 1999 and 2003. However, the labour market in Quebec appears to be much more dynamic than that in Europe. Whereas long term unemployment in Quebec is only 7.7% of total unemployment in 2003, in the European regions of the DC network long term unemployment is on average 35.6% - in some cases even exceeding 40% (Nord-Pas-de-Calais, Baden-Württemberg and Catalonia). It is clear that long term unemployment in Europe is of a very different magnitude to that in Quebec[6].

On the other end of the spectrum, Maryland and Lombardy only face an unemployment rate that is (well) below 5%. Although unemployment in Lombardy was already among the lowest in 1999, the region managed to cut unemployment even further to 3.6%. Long term unemployment in Lombardy decreased from 43.4% to only 35.1% over the period 1999-2003.

4.3. Conclusion

Since 1998 the DC regions have been able to maintain and improve their regional wealth with mixed success. Especially after 2000 many regions have been hard hit by the global economic downturn. However, since 1999 the labour market in the DC regions has on average evolved positively with approximately 1.4 million new jobs and an average unemployment rate that has decreased by more than the EU average. Job creation is almost completely accounted for by service industries. A clear sectoral shift is taking place in the various regional labour markets. Whether this has already worked its way through to the international competitive position of the different regions will be discussed in subsequent chapters.

[6] / There are no data available for Maryland on long term unemployment.

5 POPULATION AND HUMAN CAPITAL

The first and most important input factor in any creative region is the population. It is people that make an economy work; they are the basis of any activity, organisation or creative process. More specifically, the part of the population that is economically active is central to the wealth creation of a region. However, although their contribution is biggest, Florida (2002) states that a population that in general is diverse in many respects – in age, nationality, colour – and tolerant, contributes directly to a creative atmosphere that stimulates creativity and entrepreneurship. Therefore, this chapter will look further than the human capital in the different regions, but will discuss the population in a broader perspective.

5.1. Diversity in age

A diverse and well-educated population can be seen as a first prerequisite for a creative economy. One initial measure of diversity is the age distribution of the population. Subject to respect and tolerance for all ages, encounters among people of different age can spur creativity and knowledge exchange. Moreover, the age distribution of the population can give an indication about the green and grey pressure of the population, i.e. the pressure on the active population to support the young and the elderly.

→ Table 9 Age distribution, 2003

	0-19	20-64	20-34	35-49	50-64	65 AND OVER	65-79	80 AND OVER
BADEN-WÜRTTEMBERG	21.9%	61.5%	19.4%	24.1%	18.0%	16.6%	12.6%	3.9%
CATALONIA	19.2%	63.6%	24.4%	22.3%	16.9%	17.2%	13.0%	4.2%
FLANDERS	22.4%	60.2%	19.3%	23.1%	17.8%	17.4%	13.5%	3.9%
LOMBARDY	17.7%	63.7%	20.8%	23.2%	19.7%	18.6%	14.3%	4.3%
MARYLAND	28.0%	60.7%	19.6%	24.6%	16.5%	11.3%	8.2%	3.1%
NORD-PAS-DE-CALAIS	28.3%	57.6%	21.3%	20.9%	15.4%	14.1%	10.8%	3.3%
QUEBEC*	24.2%	62.5%	19.5%	25.3%	17.8%	13.3%	10.3%	3.0%
RHÔNE-ALPES	26.0%	58.8%	20.3%	21.4%	17.1%	15.2%	11.3%	3.9%
SCOTLAND	23.9%	60.0%	19.6%	22.4%	18.0%	16.1%	12.1%	4.0%

*: Quebec, 2001

Source: Eurostat, US Census Bureau, Institut de la Statistique du Québec (Census)

In general, age distribution does not differ materially between regions. However, the slightly larger proportion of 0-19 year olds in Maryland and Nord-Pas-de-Calais is striking, as is the large proportion of the elderly in Lombardy, Flanders and Catalonia.
As to the distribution of the population of working age (20-64) within three age groups, the following observations can be made. In all regions but Catalonia and Nord-Pas-de-Calais the greatest proportion of people of working age is in the age group 35-49. Catalonia and Nord-Pas-de-Calais have the highest proportion of people in their twenties to mid-thirties. Although the 50-64 age group is smallest in all regions, it already represents almost one third of the total population of working age and is largest in Lombardy, Scotland and Flanders.

→ Table 10 Distribution of working age population (20-64), 2003

	20-34	35-49	50-64
Baden-Württemberg	31.6%	39.2%	29.2%
Catalonia	38.4%	35.1%	26.6%
Flanders	32.0%	38.4%	29.5%
Lombardy	32.6%	36.4%	31.0%
Maryland	32.3%	40.5%	27.2%
Nord-Pas-de-Calais	37.0%	36.3%	26.7%
Quebec	N.A.	N.A.	N.A.
Rhône-Alpes	34.6%	36.4%	29.1%
Scotland	32.6%	37.4%	30.0%

Source: Eurostat, US Census Bureau

5.2. Cultural diversity

Most developed countries and regions face demographic challenges. A declining birth rate means that the number of people entering the labour market will grow at a slower pace, while demand for knowledge workers is increasing. These demographic changes will intensify competition for highly qualified workers within and between countries and regions[7]. In order to keep matching supply and demand, regions will need to attract well educated foreigners.

Besides adding to the labour force, foreigners can also contribute to society in other ways. People with a different culture, background and skills can enrich a society. Immigration of talented people will

7 / The strategic goal for the EU set at the Lisbon European Council held in March 2000 was "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". One of the pillars in achieving these goals is more investment in education and training (Source: "Education & training 2010"). But it is not only the EU that wants to become the best knowledge economy in the world. The Canadians have has also set specific targets which should help them in building the most skilled and talented labour force in the world. Canada wants to increase learning opportunities for adults by one million and raise the admission of Master's and PhD students at Canadian universities by 5 percent per year. Recruiting foreign talent should boost Canada's innovation performance and enable them to face the challenges of today's economy (Source: Canada's Innovation Strategy).

increase diversity. Not only can people learn from this (ethnic) diversity, tolerance and diversity will also increase creativity. Foreigners can share their knowledge and add a different perspective. A tolerant and open environment that values these differences stimulates creativity. Thus both temporary and permanent workers can add economical and social value.

The proportion of foreigners in the total population varies widely from 2.6% in Lombardy to 12% in Baden-Württemberg. In general two groups can be distinguished: one comprising the regions with a relatively high percentage of people of foreign nationality (Baden-Württemberg, Catalonia, Maryland, Quebec and Rhône-Alpes) and the other comprising the regions with a relatively low proportion of foreigners (Flanders, Lombardy, Nord-Pas-de-Calais and Scotland).

→ Table 11 | Share of foreigners in the total population, 2004

	% of total population
Baden-Württemberg	12.0%
Catalonia	9.4%
Flanders	4.8%
Lombardy*	2.6%
Maryland*	9.8%
Nord-Pas-de-Calais*	3.3%
Quebec*	9.9%
Rhône-Alpes*	8.4%
Scotland*	3.3%

*: 1999 for Nord-Pas-de-Calais and Rhône-Alpes; 2000 for Maryland; 2001 for Quebec and Scotland; 2003 for Lombardy

Source: Statistisches Landesamt Baden-Württemberg, Idescat, Lombardia regional statistical yearbook, US Census Bureau, INSEE, Institut de la Statistique du Québec, Scottish Executive, Shanghai Municipal Government

As already mentioned, in the knowledge-based economy the focus will be on attracting highly educated individuals. However, the data shown above give no information on the educational attainment of the foreigners, which can vary greatly between regions. In the future it might be interesting to collect information on this. Nevertheless this is not to say that in the knowledge-based economy there will be no room left for the lower educated. As they support all knowledge intensive activities, it would be wrong to focus immigration policy only on the highly educated in the future.

Besides attracting foreign workers, a region may also increase its cultural diversity by attracting foreign students. As some students stay in their host region after their studies, this may also be a way to fill in any gap between labour supply and demand. Other students return to their home country, but retain certain relations with their former host region or country, what may stimulate knowledge exchange.

The proportion of foreign students[8] in the total student population is much higher in Baden-Württemberg (12.7%), Scotland (9.5%) and Rhône-Alpes (8.2%) than in the other regions.

→ Table 12 Foreign students in absolute number and percentage of total student population, 2003-2004

	Foreign students	% foreign students in total student population
Baden-Württemberg	34,594	12.7
Catalonia	8,468	3.5
Flanders	7,179	4
Lombardy	5,853	2.2
Maryland	12,633	4.4
Nord-Pas-de-Calais	8,459	5.8
Quebec	9,595	3.7
Rhône-Alpes	1,799	8.2
Scotland	23,946	9.5

Source: Eurostat, NAFSA: Association of International Educators, Citizenship and Immigration Canada

Attracting foreign human capital can be as valuable to a region's economy as attracting foreign investment. Retaining those with the highest level of education is equally important.

However, the importance of international labour mobility should not be overestimated. A rather small proportion of the workforce actually considers emigrating. Fisher (2000) states that with the increasing importance of social and professional networks, people build "location-specific insider advantages". These insider advantages are not transferable to other places (of work and residence), and thus will be lost on emigration. Other factors like having a working partner or owning a house further increase the probability of staying. The longer people have stayed in one place and the more of these insider advantages they have accumulated, the less likely they are to move. Because of these insider advantages, attracting talented individuals from abroad is not just a matter of job and remuneration. A region needs to offer the opportunities to build new work and leisure related insider advantages. Hence a good overall quality of life is of paramount importance in both attracting highly skilled individuals and avoiding a brain drain.

[8] / Students from another region but from within the same country are excluded in the number of foreigners studying at the universities of the region.

5.3. Human capital and education

To remain competitive in the knowledge-based economy of the 21st century, regions, like companies, need to invest in technology and innovation, but also in the development of knowledge, skills and creativity. Higher education plays a central role in building a knowledge economy. A well educated workforce - a region's human capital - is a condition for economic growth.

In the knowledge-based economy, the demand for well educated people will keep increasing. An education system should develop the skills, knowledge and creativity of individuals and prepare them for the challenges of the knowledge-based economy. In all sectors, the importance of knowledge is ever increasing and more jobs require some form of post-secondary education. The importance of education is also stressed by the OECD (2001a), who state that people with a high level of educational attainment, have strong abilities to learn and to create new knowledge. EU policy makers also have realised the importance of education in the economic development of the European Union. One of the targets of the EU Lisbon strategy[9] is to increase the number of 22-year olds who complete secondary education to at least 85% by 2010.

5.3.1. Measuring human capital

Human capital is often measured by the highest level of education. However, this measure is an indicator of input and does not reflect the quality of education or learning. It does not take skills and competences gained after formal education into account. Neither are more implicit forms of learning and knowledge transfer, which can have a big impact on economic performance, not covered by this measure. On-the-job-training and informal learning could even generate more economically relevant knowledge and skills than some forms of formal education. An indicator for lifelong learning could solve part of this concern. Youngman (2003) even suggests direct testing of skills. This would facilitate comparing the level of those skills relevant to economic productivity.

5.3.2. Human capital and economic growth

To measure the social and economic returns of education and training, one should measure the impact of educational attainment on economic growth. Hanushek and Kimko (2000) find a consistent, stable and strong relationship between labour force quality and economic growth. Manuelli and Seshadri (2005) also suggest that human capital plays a central role in determining the wealth of nations. Investigating the relationship between human capital and economic growth, Mankiw (1992) concluded that secondary education attainment has a significant impact on productivity levels. Investment in human capital thus can generate economic growth. The OECD (2001a) also found a clear relationship between learning and economic performance (measured by GDP per capita), but also found that secondary education is more important than tertiary educational attainment at the EU level. However, evidence at regional level shows that national variations in economic performance can be explained by tertiary education levels. Student and labour mobility may also blur this correlation. The impact of tertiary education depends on a region's industrial structure and the co-ordination between education and industry. According to Bretschger (1999), variations in the level of human capital can partially explain regional growth differences:

[9] / The current level of completion of upper secondary education in the EU reached 76% in 2002.

"An increasing stock of knowledge leads to rising productivities of regional inputs like labour, physical capital and human capital, as well as to higher per-capita incomes. In the long run, the accumulation of knowledge largely determines the growth of total factor productivity, which is often considered to be the best available indicator for regional development and competitiveness. As the spatial pattern of an economy plays a decisive role in regional development, the diffusion of knowledge is just as important as the creation of knowledge."

Apart from direct economic returns, educational attainment may have some indirect effects on output. More importantly, in addition to productivity effects, education has an impact on personal development and brings benefits to society. Nevertheless, Psacharopoulos and Patrinos (2004) estimate private returns of education to be higher than social returns. According to Weiss (1995) countries with high levels of human capital not only have high growth rates, but also high levels of GDP per capita. He believes that this relationship shows that education has a direct influence on productivity, but also warns for a careful interpretation of this correlation. He makes the observation that wealthier countries tend to supply better access to schooling. He also states that in more highly developed societies, more jobs require higher levels of education.

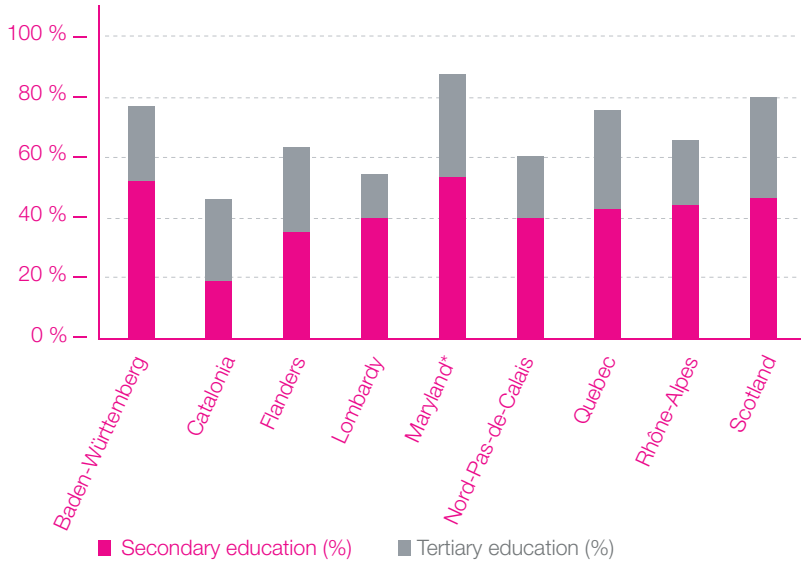
5.3.3. Secondary and tertiary education[10]

There is a substantial gap in tertiary attainment between the leading regions (e.g. Maryland, 35.2%) and those at the other end (e.g. Lombardy, 11.9%). Despite being one of Italy's leading regions in educational attainment, with only 11.9% of its population aged 25-64 having a tertiary education degree, graduation rates need to increase in Lombardy. In Catalonia tertiary attainment is much higher than in the rest of Spain, but secondary attainment is rather low. In France, Rhône-Alpes has higher attainment levels than Nord-Pas-de-Calais in both secondary and tertiary education.

Maryland claims to have one of the best educated workforces in the USA and ranks fourth among the states in tertiary attainment. Quebec (32.4%) and Scotland (31.7%) also have high attainment rates, but while Scotland outperforms the UK, Quebec is somewhat below the Canadian average. In Flanders, tertiary attainment is high (30.2%), but secondary attainment is relatively low (35.2%).

[10] / Secondary and tertiary attainment refer to the highest level of educational attainment. Students completing tertiary education, have first completed secondary education. These persons are only included in tertiary attainment, not in secondary.

→ Figure 10 Percentage population between 25 and 64 with secondary and tertiary education, 2004



*: Maryland: population > 25 years

Sources: Eurostat[11], Statistics Canada, US Census Bureau

Scotland has the highest proportion of 18-24 year olds in tertiary education (56%). Lombardy, Rhône-Alpes and Catalonia all have rates over 40%. In Baden-Württemberg students make up less than one third of the population in this age group. The total number of students in tertiary education relates to people living in the region who are registered in tertiary education. They may be studying in that region, another region or abroad.

→ Table 13 Percentage of population between 18 and 24 year in tertiary education, 2003-2004

	Total number of students	% population between 18 and 24 yr in tertiary education
Baden-Württemberg	270,968	31.2
Catalonia	241,469	40.4
Flanders	178,349	35
Lombardy	266,017	42.1
Maryland	310,000	n.a.
Nord-Pas-de-Calais	144,760	34.7
Quebec	260,100	37.3
Rhône-Alpes	219,122	40.5
Scotland	251,951	56.3

Source: Eurostat, Maryland Higher Education Commission Enrolment Information System, Statistics Canada

[11] / Data based on the European Union Labour Force Survey (LFS). In Baden-Württemberg (4.8%) and Scotland (4.2%) more than 4% of the sample did not answer this question. This probably has a negative impact on attainment rates.

5.3.4. Universities

Universities and other higher education institutions are crucial to the development of a region's human capital. Higher education institutions can affect local labour markets in different ways. An increase in the average level of human capital can provide the foundation for innovation and productivity growth.

By attracting foreign and domestic students, from both inside and outside the region, universities help build a region's workforce of the future. Moreover, regions with universities have higher migration flows, both into and out of the region, but as these cancel each other out, there is no effect on net migration. Collaboration in research between universities, companies and other research institutions should be encouraged. As universities and spin-offs attract highly skilled individuals, companies in knowledge intensive and high-tech industries can benefit from this concentration of knowledge and talent.

The number of universities per region ranges from 6 in Flanders to 14 in Maryland. Taking population size into account, Maryland and Scotland have the densest university landscape, 2.6 and 2.5 per million inhabitants respectively. Baden-Württemberg, on the other hand, has less than one university per million people (0.8). Most DC regions have more universities per million inhabitants than their national average.

As regards the number of universities shown below, it is important to take the following into account. First, DC regions' higher educational systems vary considerably. Therefore, it may be difficult in some regions to distinguish universities from other higher education institutions. Also, some have both an extensive public and private educational system, whereas in others private universities may be very few or even non-existent. Second, one might wonder whether a high absolute number of universities increases the diversity of supply and thus is beneficial to the student, or whether it implies a fragmentation of supply and thus a less efficient allocation of available resources.

→ Table 14 | Number of universities

	Population (mio)	Number of universities	Number of universities per mio population
Baden-Württemberg	10.6	9	0.8
Catalonia	6.3	12	1.9
Flanders	6	6	1
Lombardy	9	12	1.3
Maryland	5.4	14	2.6
Nord-Pas-de-Calais	4	8	2
Quebec	7.4	8	1.1
Rhône-Alpes	5.8	9	1.6
Scotland	5.1	13	2.5

Source: Statistisches Landesamt Baden-Württemberg, Idescat, Lombardia regional statistical yearbook, Maryland Higher Education Commission, INSEE, Gouvernement du Québec, Universities Scotland

The Academic Ranking of World Universities (ARWU)[12] ranks the top 500 universities based on academic and research performance. Quality of education is measured by the number of alumni winning Nobel Prizes and Fields Medals. The authors assume that a faculty member's research output is an indication of her/his educational performance. Whether a high research output equals good education, is open to debate, but as this is an academic ranking, it is based on academic performance. No measure of education quality will ever be perfect and will always be subject to debate. The big advantage of this ranking is its comparability and the objectivity of the measure. This ranking is well known, and one of the objective (although imperfect) criteria students can use to decide on their educational institution.

Nord-Pas-de-Calais has no universities in the top 500, while Rhône-Alpes has 4. Baden-Württemberg may be home to relatively few universities, but 7 of the 9 (78%) in this region are in the top 500. Many of the universities in Flanders (67%) and Quebec (63%) are also represented in the top 500.

An often-heard remark on the methodology of this ranking concerns the dominant position of American universities. One third (170/500) of the universities in the list are in the USA. At the top of the list, the USA dominates with 17 universities in the top 20 and 51 in the top 100, while the list features universities from 35 (developed) countries.

→ Table 15 | Number of universities in ARWU-500

	Number of universities in top 500	Total number of universities	% of universities in top 500
Baden-Württemberg	7	9	78%
Catalonia	2	12	17%
Flanders	4	6	67%
Lombardy	3	12	25%
Maryland	4	14	29%
Nord-Pas-de-Calais	0	8	0%
Quebec	5	8	63%
Rhône-Alpes	4	9	44%
Scotland	5	13	38%

Source: Academic Ranking of World Universities - 2005

[12] / Sources: N.C. LIU and Y. CHENG: Academic Ranking of World Universities – Methodologies and Problems; Institute of Higher Education and Shanghai Jiao Tong University: ARWU 2005.

KARNATAKA: BANGALORE, INDIA'S SILICON CITY

Since local entrepreneurs and the technology giant Texas Instruments discovered its potential as a high-tech city in the early 1980s, Bangalore has seen a major technology boom. In the last decade many Western companies decided to outsource their IT jobs to cut overheads. Much of this exodus has been destined for India, and more particularly for Bangalore, which is now home to more than 250 high-tech companies and the highest number of engineering colleges of any city in the world. Consequently, Bangalore is now no longer called 'The Garden City of India' but rather India's 'Silicon Valley' or 'Silicon City'.

Many multinational corporations, especially computer hardware and software giants, nowadays have operations in Bangalore. Software exports from Bangalore grew by 70% in 2001 compared to the previous year, in 2002 by 33% and by 25% in 2003. Hardware exports have shown an equally remarkable growth rate, e.g. the Electronic Hardware Technology Park (EHTP) companies grew by 67% in 2003. Although Karnataka's thriving IT industry has up to now been mostly concentrated in and around Bangalore, lately other parts of Karnataka have also seen their IT related activities growing.

What made Bangalore as synonymous with high-tech as Seattle or Silicon Valley? The availability of a large concentration of research institutes, a large talent pool of highly trained professionals, state-of-the-art infrastructure and progressive government policies have predominantly led to this amazing IT explosion in the city. Other reasons that are also often said to play and have played a role are the widespread knowledge of English, a legacy of India's colonial past, the emigration, mainly to the USA, and subsequent remigration of a considerable percentage of India's population, the presence of a very large domestic (labour) market as India nowadays is world's second most populous country and Bangalore's pleasant and equable climate.

Research & Development

The establishment of premier research institutes is said to have set a scientific temper on Bangalore, and thereby laid the foundations for its success story. One of the first would be the Indian Institute of Science, which paved the way for many other quality research and development institutions such as the Indian Institute of Astrophysics, the Raman Research Institute, the Jawaharlal Nehru Centre for Advanced Scientific Research and the National Center for Biological Science.

Education

Bangalore is home to a wealth of universities, post-graduate institutions, engineering colleges, industrial training institutes, etc renowned for their academic excellence both in India and abroad, such as the Indian Institute of Management – Bangalore (IIM-B), the Indian Institute of Science (IISc), the National Law School of India University and the Institute of Bioinformatics and Applied Biotechnology – Bangalore (IBAB).

Focussing on the domain of Information Technology, one can find plenty of IT related education and specialized training centres, e.g. the National Centre for Software Technology and the Indian Institute of Information Technology - Bangalore (IIIT-B), a public private partnership which is promoted by both the government of Karnataka and the IT industry.

This abundance of engineering colleges has been constantly fuelling Bangalore's IT industry with specialised human resources.

Infrastructure

The national government invested heavily in scientific, communication and technological infrastructure for more than 40 years, what resulted in nearly a dozen self-contained industrial parks.

Completed in 1989, the 135 hectare (332 acres) Electronic City, located in the southern outskirts of Bangalore, is exclusively meant for electronics industries and houses IT industry leaders such as Motorola, Infosys, Siemens, ITI, and Wipro etc. The area is maintained by Keonics (Karnataka State Electronics Development Corporation Limited), which provides all the necessary high-quality infrastructure. Other high standard industrial parks were set up subsequently, such as The International Tech Park, Bangalore, which offers a one-stop solution integrating office, production, commercial, residential and recreational needs in a single location. In 1992 Bangalore was the first city in India where a satellite earth station was set up for high speed communication services to facilitate software exports. In August 2000, a Cyber Park - Technology Incubation Centre, another first of its kind, was set up in Bangalore to promote the growth of the IT sector; in September 2002 IT Park Hubli, a software technology park, was inaugurated, etc.

Policy

The current symbiosis of IT industry, research and training could not have been realized without visionary and coherent policies of the government.

Already in 1986 the Ministry of Information Technology, recognizing the immense potential of the Indian Software Industry, brought out a policy document on “Computer Software Export, Software Development and Training”. In 1991 Software Technology Parks of India (STPI), a scheme to promote and facilitate software exports from India, was set up. Offering new fiscal incentives, state-of-the-art infrastructure such as international high speed data communication services and an investor friendly environment, the scheme has contributed to a steep growth in software exports.

Companies registered under the Software Technology Park (STP) scheme obtain several benefits, including single window government clearance, complete duty free import and exemption from corporate income tax up to 90%.

Karnataka was India’s first state to announce its Information Technology Policy, called ‘Mahiti’, in 1997. This Policy has acted as an important catalyst for the growth of the IT industry. It commits the government to ensure the best possible infrastructure and encourages businesses to setup their operations in the state of Karnataka.

In 2000 the government of Karnataka felt the need to redirect its IT Policy, due to the rapidly evolving industry (IT usage is becoming more widespread and relevant, technologies are advancing, prices are dropping, etc.) and announced ‘Mahithi’, the Millennium IT Policy. This new policy focuses on using e-governance to make the government more proactive and responsive to the citizen’s needs, in urban as well as in rural areas. It aims to address IT to core issues like eradication of poverty, empowerment of women, unemployment, and promotion of Karnatka in IT. Other highlights of the policy are the creation of incubation centres for start-up companies and spurring business with non-English speaking countries.

Next to the benefits that are part of the STP, the government of Karnataka offers investors in the IT sector many other advantages, including entry tax exemption on computer hardware, computer peripherals and

other capital goods including captive power generation sets during implementation stage (which can be extended up to 5 years from the date of commencement of implementations), power tariff concessions, quick clearances from the Karnataka State Pollution Control Board and concessions on company registration charges for IT companies expanding, diversifying and modernizing their activities.

To secure the supply of highly talented graduates, the government of Karnataka has set up BITES – The Board for Information Technology Education Standards – a non-profit society in cooperation with the IT industry and educational institutions to promote and accredit education in information technology.

Lately, Karnataka has been attracting activities in other domains than IT. More in particular, biotechnology is a rapidly expanding field in the city thanks to Karnataka's comprehensive Millennium Biotech Policy formulated by the Karnataka Vision Group on Biotechnology and launched in 2001. The policy is expected to spur the growth of the biotech industry and encourage extensive research and development in various biotech fields. Bangalore accounts for at least 97 of the approximately 240 biotechnology companies in India, who have easy access to local human resources from quality education and research institutions, such as the National Center of Biological Sciences (NCBS) and the Indian Institute of Science (IISc).

source: Government of Karnataka, Department of IT and Biotechnology, http://www.bangaloreit.in;
Software Technology Parks of India, Bangalore http://www.blr.stpi.in;
http://www.keonics.com;
http://business.timesonline.co.uk/article/0,,16614-1927247,00.html;
http://www.domain-b.com/infotech/itnews/200004Apr/20000403govtof_karnataka_mahithi.htm;
http://www.bangalorebio.com" http://www.bangalorebio.com

4.3.5. Lifelong learning

Learning enables people to improve their position in the labour market and increase their productivity and earnings. Labour force participation rates of highly skilled workers are higher. Through the development of skills, knowledge and competencies, an individual can contribute to the economy and society as a whole. A lifelong learning policy should focus on both the employed and the unemployed. Lifelong learning should be accessible to everyone, young or old, people who haven't completed secondary education as well as those with very high education levels.

The results of the Eurobarometer (2003) survey of lifelong learning indicate that most people (87.9%) in the EU-15 think that lifelong learning is important. The majority (81.8%) do not believe that lifelong learning should only take place when you are young. In Spain 78.1% think it is mainly for the middle-aged, with the EU-15 average at 30.5%.

→ Table 16 | Lifelong learning participation, 2004

	Lifelong learning participation, age 25-64 (1,000's)	Growth rate 2003-2004	% of population between 25 and 64
Baden-Württemberg	489.6	27%	9.8
Catalonia	109.4	-8%	2.9
Flanders	318.9	30%	9.8
Lombardy	324	46%	6
Maryland	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	151	15%	7.1
Quebec	n.a.	n.a.	n.a.
Rhône-Alpes	213.9	4%	7.4
Scotland	409.9	-26%	15.3

Source: Eurostat[13]

Most European regions have seen a steep increase in lifelong learning participation rates. Scotland, however, has witnessed a drop from 557,400 people (20.7%) in 2003 to 409,900 (15.3%) in 2004. This can partly be explained by the high number of missing values in the survey. In 2004, 15.3% of the Scots between 25 and 64 years of age stated they had participated in lifelong learning while 54.6% had not. This leaves 30.1% or 808,000 people who did not answer the question. No other region reported missing values for this indicator, except Lombardy (0.5%). Despite this decline, Scotland remains the best performer of the European regions. As the UK is one of the 3 best performing EU member states, the relatively high participation rate in Scotland is not surprising. The EU average is 8.4% in 2004. This percentage should increase to at least 12.5% by 2010 as part of the Lisbon strategy.

By measuring only lifelong learning participation in the four weeks preceding the survey, the EU methodology does not give a clear indication of the real participation rates. Evidence from the OECD (1996) at country level suggests substantial differences between the 12 month and 4 week periods.

[13] / Data for European regions are based on the EU Labour Force Survey (LFS). Lifelong learning refers to all persons aged 25 to 64 who stated that they received education or training in the four weeks preceding the survey.

→ Table 17 | Job-related training, 12 month versus 4 week period

		Age group			
	Year	25-34	35-44	45-65	Total
During the 12 month period preceding the survey					
Canada	1991	32	35	23	30
Finland	1990	51	49	40	46
France	1992	43	27	11	27
Germany	1991	33	29	21	27
Norway	1991	40	42	30	37
Sweden	1993	36	33	41	36
Switserland	1993	42	41	34	38
United States	1991	37	43	33	38
During the 4 week period preceding the survey					
Denmark	1991	17	17	11	15
Ireland	1992	5	4	2	4
Spain	1992	6	2	1	3
United Kingdom	1992	12	12	8	11

Source: OECD

Measured over a whole year, between 27% (France 1992, Germany 1991) and 46% (Finland 1990) of the employed population participated in job-related training. Over a 4 week period in 1992, only 3% of the Spanish and 4% of the Irish workforce had been involved in job-related training. The UK (11%) and Denmark (15%) score a lot better, but there still is a considerable gap with the 12 month sample. In 1991, participation rates in Canada and the USA were 30% and 38% respectively. At that time, the top European countries performed better than the USA and Canada. France and Germany were the worst performers in the survey, but they lagged just 3 percentage points behind Canada. Moreover, according to the recent Scottish Labour Force Survey 2004/05 2,269,000 people or 68.6% of the population aged between 16 and 69 participated in adult learning in 2004.

5.4. Labour force

"However, knowledge in itself does not contribute to economic growth. It has to be incorporated in the production of goods and services. Educated and skilled individuals have to be produced and their knowledge and skills have to be used."[14]

[14] / Source: OECD, 2001a

The generation of regional wealth entirely depends on the efficient allocation of the population in a region. The inclusion of as many people as possible in the labour market has received a lot of attention lately. Increasing and improving employment was one of the main targets set at the Lisbon European Council in 2000. Overall EU employment rates should rise from 61% to 70% by 2010 and the number of women in employment should increase from 51% to more than 60%[15]. Moreover, employment of older workers should reach 50% by 2010[16].

Education is crucial in raising employment levels. According to the OECD (1996), the average unemployment rate for people with lower-secondary education was 10.5%, while that for those with university education was only 3.8%.

5.5. Human resources in science and technology[17]

While promoting science, technology and innovation, most governments in economically advanced countries bring the aspect of human capital at the forefront. Human resources are considered a crucial factor in economic growth, and a key element in the competitiveness of a country. The technical evolution of the labour process (be it manufacturing or service industries) demands skilled labour. In the literature this is called evolution towards the knowledge-based economy. Several trends – like the low participation rates of women and the insufficient supply of scientists and engineers to cover the demand – are noted in recent international reports (OECD, 2000). Meeting the demand for skilled labour requires an ongoing investment in the educational system.

Advocates of the National Innovation System idea have emphasised that technical progress as a vehicle for economic growth should be interpreted much broader than the mere R&D efforts of private or public companies (Fagerberg and Verspagen, 1996). The OECD has devised the “Canberra Manual” to organise the international comparability of data collection on human resources in science and technology (OECD, 1995).

The idea of human resources in science and technology (HRST) is that it concerns people who find themselves in one of the following situations: (1) they have completed third-level education in an S&T field of study (sciences, engineering, medical sciences), usually referred to as HRSTE; (2) they are not formally qualified but employed in a S&T occupation under the ISCO classification (such as physical, mathematical, engineering science, life science and health professionals), usually referred to as HRSTO; (3) they are both, referred to as the core coverage HRSTC[18]. This is depicted schematically in Figure 11, showing that not all people educated in science and technology automatically proceed to employment in a science and technology environment.

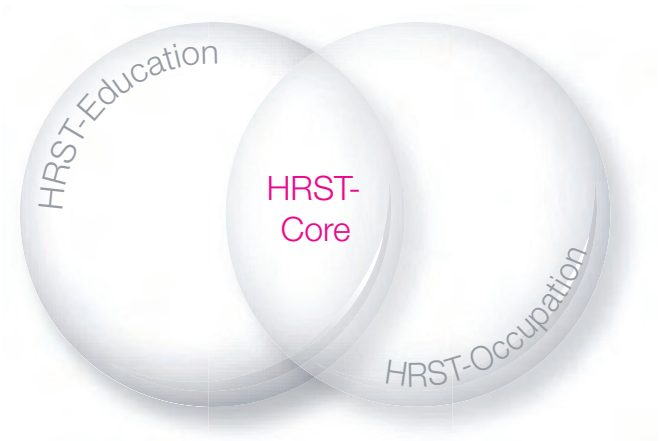
[15] / Source: Presidency conclusions, Lisbon European council (2000), on line available at http://ue.eu.int/ueDocs/cms_Data/docs/pressData/en/ec/00100-r1.en0.htm

[16] / Source: http://europa.eu.int/comm/employment_social/employment_strategy/index_en.htm

[17] / This section is the result of contributions by the following authors: André Spithoven, Nathalie Moray and Bart Clarysse.

[18] / Examples of core coverage occupations are physicist, meteorologist, chemist, geologist, operation research analyst, statistician, computer system engineer, computer programmer, architect, bridge construction engineer, electrical engineer, mechanical engineer, cartographer, microbiologist, zoologist, pathologist, agronomist, dentist, professional level nurse.

→ Figure 11 | Human resources in science and technology (HRST) classification



Source: OECD, 1995

Data on human resources in science and technology are not gathered by survey methods as is the case with indicators on R&D expenditure and R&D personnel. Instead they are drawn from administrative registers. Table 18 shows the number of full time equivalents of human resources in science and technology in all three categories outlined above for the years 1995 and 2004; Table 19 shows their total growth rate over this decade.

In absolute figures Baden-Württemberg and Lombardia take the lead in total human resources in S&T in 2004. While Baden-Württemberg has by far the most human resources in all three of the sub-groups (education, occupation and core), Lombardy only has the second largest group of human resources by occupation. In terms of education and core, Catalonia comes second.

In comparison to human resources in science and technology in 1995, all regions have seen their resources grow in the last decade, and this applies to total human resources as well as to the three sub-groups. However, growth was more notable in some regions than in others. Catalonia, where human resources in S&T almost doubled over the period 1995-2004 from 650,000 to 1,200,000, registered the most striking growth (+91%), whereas in Rhône-Alpes total growth was limited to a mere 27,000 people (+2.8%). Next to Catalonia, Nord-Pas-de-Calais and Lombardy have also seen their total human resources in S&T rise considerably over the period 1995-2004 with a growth rate of 58% and 56% respectively.

→ Table 18 | Human resources in science and technology and sub-groups, 1995 and 2004

1995	Human resources in science and technology			
	All	Education	Occupation	Core
Baden-Württemberg	1,874,281	1,194,472	1,349,285	669,476
Catalonia	646,743	540,513	361,134	254,904
Flanders	915,738	732,741	573,907	390,910
Lombardy	936,745	434,261	770,853	268,370
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	341,989	238,299	256,772	153,082
Quebec*	1,006,510	604,490	750,695	348,675
Rhône-Alpes	936,745	585,941	613,656	357,989
Scotland	749,914	596,445	488,116	334,647

2004	Human resources in science and technology			
	All	Education	Occupation	Core
Baden-Württemberg	2,156,643	1,434,905	1,560,801	839,063
Catalonia	1,235,607	1,076,916	700,613	541,922
Flanders	1,196,725	979,479	724,627	507,381
Lombardy	1,462,913	648,210	1,267,947	453,244
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	538,841	383,832	390,603	235,595
Quebec*	1,158,710	712,355	854,675	408,320
Rhône-Alpes	963,363	679,119	658,443	374,199
Scotland	971,718	829,006	548,212	405,500

*: Quebec: 1996-2001

Source: Eurostat, Institut de la Statistique du Québec

→ Table 19 | Growth of human resources in science and technology and subgroups, 1995-2004

	Human resources in science and technology			
	All	Education	Occupation	Core
Baden-Württemberg	15.1%	20.1%	15.7%	25.3%
Catalonia	91.1%	99.2%	94.0%	112.6%
Flanders	30.7%	33.7%	26.3%	29.8%
Lombardy	56.2%	49.3%	64.5%	68.9%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	57.6%	61.1%	52.1%	53.9%
Quebec*	15.1%	17.8%	13.9%	17.1%
Rhône-Alpes	2.8%	15.9%	7.3%	4.5%
Scotland	29.6%	39.0%	12.3%	21.2%

* Quebec: 1996-2001

Source: Eurostat, Institut de la Statistique du Québec

The data shown in Table 18 gives a very first indication of the volume of human resources in science and technology present in a region. However, to have a more correct view, figures in Table 18 should be corrected for region size. This has been done in Table 20, where human resources in science and technology are related to the active population (the population aged between 25 and 64 years old) of the region. This gives us a better idea of the degree to which the regions are knowledge intensive in terms of human resources.

→ Table 20 Human resources in science and technology and sub-groups in % of the active population (25-64), 1995 and 2004

1995	Human resources in science and technology			
	All	Education	Occupation	Core
Baden-Württemberg	42.7	27.2	30.8	15.3
Catalonia	29.1	24.3	16.3	11.5
Flanders	41.5	33.2	26.0	17.7
Lombardy	28.8	13.3	23.7	8.2
Maryland	N.A.	N.A.	N.A.	N.A.
Nord-Pas-de-Calais	26.5	18.4	19.9	11.5
Quebec*	30.4	15.3	28.2	13.1
Rhône-Alpes	37.0	25.8	27.0	15.7
Scotland	37.1	29.5	24.1	16.6

2004	Human resources in science and technology			
	All	Education	Occupation	Core
Baden-Württemberg	46.9	31.2	34.0	18.3
Catalonia	41.1	35.8	23.3	18.0
Flanders	49.4	40.4	29.9	21.0
Lombardy	37.9	16.8	32.8	11.7
Maryland	N.A.	N.A.	N.A.	N.A.
Nord-Pas-de-Calais	35.6	25.4	25.8	15.6
Quebec*	33.3	17.8	29.7	14.2
Rhône-Alpes	42.3	29.8	28.9	16.4
Scotland	46.4	39.6	26.2	19.4

*Quebec: 1996-2001

Source: Eurostat, Institut de la Statistique du Québec

With more than 45% of the active population working and/or having graduated in science and technology, Flanders (49.4%), Baden-Württemberg (46.9%) and Scotland (46.4%) are the most knowledge intensive regions. All other regions are, according to these data, less knowledge intensive than the EU-15 on the whole. In 2004 the average percentage of the economically active population of the EU-15 classified as HRST reached 42.5 % (41.0% for the EU-25). However, with a proportion of still above 40%, Rhône-Alpes and Catalonia are doing better than the remaining regions. By education, human resources in science and technology are largest in Flanders and Scotland with around 40% of the total active population. The same goes for core science and technology professionals: they represent 21% of the active population in Flanders, and close to 20% in Scotland. In contrast, the share of HRST by occupation is largest in Baden-Württemberg and Lombardy (with 34 and 32.8% respectively).

In Table 18, Table 19 and Table 20 it is very difficult to compare the HRST growth performance of Quebec with that of the remaining regions due to different time frames. For the latter data apply to the decade 1995-2004, whereas for Quebec it is only a six year period (1996-2001). To partially overcome this problem (the beginning and end years of the periods observed still do not coincide), we can take a look at the annual growth rates of HRST. Moreover, Table 21 enables us to compare these growth rates with that of total regional employment.

→ Table 21 | Compound annual growth rate of HRST, HRST sub-groups and total employment, 1995-2004

	Human resources in science and technology				
	All	Education	Occupation	Core	Total employment
Baden-Württemberg	1.6%	2.1%	1.6%	2.5%	0.4%
Catalonia	7.5%	8.0%	7.6%	8.7%	4.1%
Flanders	3.0%	3.3%	2.6%	2.9%	1.0%
Lombardy	5.1%	4.6%	5.7%	6.0%	1.4%
Maryland	n.a.	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	5.2%	5.4%	4.8%	4.9%	2.5%
Quebec*	2.9%	3.3%	2.6%	3.2%	1.3%
Rhône-Alpes	0.3%	1.7%	0.8%	0.5%	0.5%
Scotland	2.9%	3.7%	1.3%	2.2%	0.5%

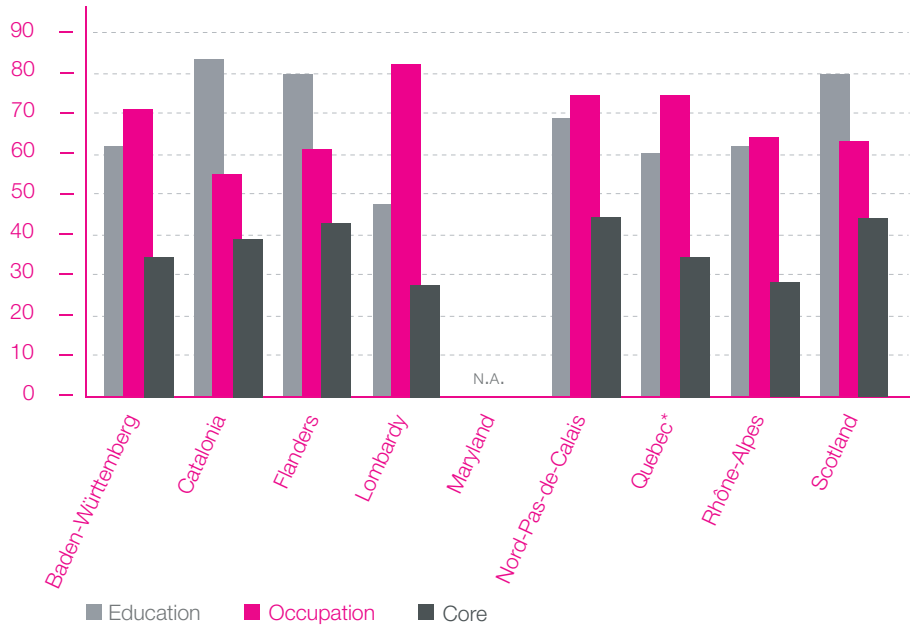
*Quebec: 1996-2001

Source: Eurostat, Institut de la Statistique du Québec

In all regions employment in science and technology – core, as well as occupation and education – has grown (much) faster than total employment, except in Rhône-Alpes. Catalonia registered the largest increase in total employment as well as in all three sub-groups of HRST. Nord-Pas-de-Calais and Lombardy have also seen their HRST grow substantially with an overall annual growth rate of HRST of 5.2 and 5.1% respectively, whereas their total employment grew (more than) twice as slowly (2.5 and 1.4% annually). While the annual growth rate of total employment was similar to the latter, Quebec and Flanders performed only averagely in terms of HRST with an overall HRST growth rate of around 3%. In Scotland HRST followed the same trend (+3% annually). However, annual total employment growth was much smaller (0.5%), equal to the growth rate in Baden-Württemberg and Rhône-Alpes. While in Baden-Württemberg HRST performed considerably better (+1.6% annually), this was not the case in Rhône-Alpes where it grew least (+0.3% annually). In Baden-Württemberg, Catalonia and Lombardy the group of core science and technology professionals has grown faster than the education and occupation sub-groups. In the remaining regions the education sub-group grew most.

To conclude this section on human resources in science and technology, we shall look at the proportions of educational, occupational and core HRST in total HRST[19].

→ Figure 12 | Share of HRST sub-groups in total HRST, 2004 (%)



*Quebec: 2001

Source: Eurostat, Institut de la Statistique du Québec

The share of the core in human resources in science and technology gives a first indication of the match or mismatch between education and the labour market. For most of the regions (Baden-Württemberg, Catalonia, Quebec and Rhône-Alpes) this is between 35 and 40%. In Flanders, Nord-Pas-de-Calais and Scotland it is somewhat above 40% and up to 44.8% in the French region. Only in Lombardy do core S&T professionals represent less than 30% of total HRST.

[19] / Note that, since total HRST is composed of the sum of HRSTE and HRSTO less HRSTC, the shares of the three sub-groups will not sum up to 100%.

A second indication of the match or mismatch between education and the labour market can be found by subtracting the percentage of core professionals from the proportion of both educational and occupational HRST, giving the percentage of people who have a degree in science and technology but whose occupation is not related to this domain and the percentage of people who are working in science and technology but do not have a formal qualification. In five out of the eight regions observed, the share of HRSTO is larger than that of HRSTE. This is most pronounced in Lombardy, where the supply of knowledge workers through education is extremely low in comparison to the other DC regions, whereas the market (as seen by occupation in science and technology) is the most extensive. Here, a potential problem occurs if endogenous growth is to be sustained, for it presupposes that there is enough attractiveness in the region for brain gain. In Catalonia, Flanders and Scotland, where the supply of knowledge workers through education is highest, the share of HRSTE is larger than that of HRSTO.

6 HARD AND SOFT LOCATION FACTORS

The goal of the creative economy is to enhance competitiveness by establishing creative, knowledge intensive activities. To achieve this, besides the availability of talent (the human capital of a region), regions and more specifically business locations have to meet specific requirements to attract business to invest in that region. Hence so called hard and soft location factors can be identified as an important input factor in the creative economy.

Hard (traditional) location factors such as infrastructure, transport cost, cost of materials and intermediate products, laws and regulations, ... have been and still are major decision factors for all businesses, as for creative and knowledge intensive firms. However, in recent years the regional economic literature has increasingly recognized the importance of soft location factors, such as access to knowledge through technology oriented research institutions, the availability of highly qualified personnel, the presence of a creative, stimulating socio-economic environment, etc.

The 'creative capital theory' attaches major importance to these soft location factors. Its main idea is that creative and knowledge intensive firms will be attracted to regions that house creative residents. Thus, firms will no longer be followed by people, rather the other way around. And what are the most important factors influencing the location decisions of people? Of course hard location factors, such as the infrastructure, the labour market situation, regulations of all kind, the average disposable income in the region, ... are important. But people will also take into account some soft determinants, such as the quality of the educational system, the general health conditions and health care provision, environmental quality, the availability of cultural and recreational facilities, public safety, the atmosphere and ethos, etc.

Up to now there is no clear consensus in the literature on the classification of location determinants into hard and soft factors. For example, Dziembowska-Kowalska and Funk (2000) define the separation between the two as follows: 'factors that influence a region's specific conditions for a certain productive activity having, thus, a direct impact on the net profit rate, and being determined by market forces or through direct market intervention should be treated as hard location factors; all other factors exerting only an indirect influence on profitability and having no "visible" impact on economic outcome should be regarded as soft factors'. As such, hard location factors would not only be prices of inputs, gross wage rates or interest rates, but also factors that directly reduce costs such as building grants and export subsidies and other factors influencing the net profit rate of firms, such as the tax level. Hard location factors are thus fairly easy to quantify, whereas all soft factors that have an indirect positive or negative effect on an economic activity are far more difficult to specify, let alone measure quantitavely.

6.1. Hard location factors

Notwithstanding the fact that soft location aspects are attracting more and more attention as factors determining the location of businesses, traditional factors remain important and in many cases decisive. This section looks at the presence of infrastructure, the taxation system and the quality of the administrative environment.

6.1.1. Infrastructure

When thinking about hard location factors, infrastructure may be the most obvious. Infrastructure includes the provision of a whole range of goods and services. This report covers both transport facilities and ICT infrastructure.

A creative region has need of an extensive transport network. Goods need to be transported efficiently within and outside regional borders. Also, creative people should be able to move around easily. Of all the means of transportation, road transport remains by far the most important. Road infrastructure can partially be captured by observing the length of the motorway network. To take into account differences in land area, these data are expressed as kilometres of motorway per 1,000 km^2.

→ Table 22 | Regional motorway infrastructure, 2000

	Km motorway per 1,000 km^2
Baden-Württemberg	28.78
Catalonia	40.56
Flanders	62.8
Lombardy	24.18
Maryland	86.44
Nord-Pas-de-Calais	48.01
Quebec	11.99
Rhône-Alpes	27.35
Scotland	4.92

Source: Eurostat; Maryland: Maryland State Highway Administration; Quebec: Transport Canada Policy Group

The table above shows that the motorway network is most extensive in Maryland (86 km per 1,000 km^2), followed by Flanders (63 km per 1,000 km^2). It is least extensive in Quebec (12 km per 1,000 km^2) and Scotland (5 km per 1,000 km^2).

However, motorway length in itself does not necessarily correspond with network quality. An extensive network may for example be close to its maximum capacity, resulting in traffic jams in peak hours.

Besides road traffic, air transport has gained importance in recent decades. The total flow of air passengers and air freight is expressed as the number of passengers and tons of goods per 1,000 inhabitants, again to take into account differences in regional size. Air transport of both passengers and goods varies widely within the DC regions. These data do not give information about the air transport capacity of the regions, neither do they show to what extent the maximum capacity has already been reached.

→ Table 23 | Total air passengers and total air freight (tons) per 1,000 inhabitants, 2001

	Passengers per 1,000 inhabitants	goods per 1,000 inhabitants (tons)
Baden-Württemberg	705.35	3.38
Catalonia	3,369.20	12.17
Flanders	3,300.61	97.41
Lombardy	2,985.30	44.79
Maryland*	1,629.44	9.25
Nord-Pas-de-Calais	239.47	0.00
Quebec*	1,423.32	18.82
Rhône-Alpes	1,077.62	6.54
Scotland	3,471.35	13.65

*: Quebec and Maryland: 2000

Source: Eurostat; Maryland Bureau of Transportation Statistics, Quebec Transport Canada Policy Group

For those regions who have direct access to the sea, this location factor may be a competitive advantage provided that the port is sufficiently developed in terms of infrastructure and efficiently linked with the rest of the region. To get an idea of the intensity of maritime transport, we will look at both the total number of maritime passengers embarked and disembarked per 1,000 inhabitants and the total volume of goods loaded and unloaded (in tons) per 1,000 inhabitants.

Of the European regions, four have sea ports, namely Flanders, Catalonia, Nord-Pas-de-Calais and Scotland. While in 2003 the total number of passengers relative to the number of inhabitants was highest in Nord-Pas-de-Calais, Flanders handled the largest volume of goods per 1,000 inhabitants.

→ Table 24 Total number of passengers embarked and disembarked per 1,000 inhabitants and total volume of goods loaded and unloaded per 1,000 inhabitants (in tons), 2003

	Maritime passengers per 1,000 inhabitants	Maritime goods per 1,000 inhabitants (tons)
Catalonia	281	8,975
Flanders	123	29,771
Nord-Pas-de-Calais	3,561	15,640
Scotland	522	20,935

Source: Eurostat

The quality of the infrastructure has been investigated in the World Economic Forum Executive Opinion Survey. In this survey executives were asked to evaluate the overall infrastructure quality and in particular the railway, port and air transport infrastructure on a scale from 1 to 7, where 1 corresponds to an infrastructure that is poorly developed and inefficient and 7 to an infrastructure that is as extensive and efficient as the world's best.

As no regional comparable data are available, national data for all DC regions are presented. However, we believe that this is not a problem with infrastructure, as very extensive distribution infrastructure in a DC region, but poorly developed infrastructure in surrounding regions will negatively affect the evaluation of the infrastructure in the DC region, and the other way around.

→ Table 25 Quality of the distribution infrastructure, 2004

		Infrastructure quality		
	Overall	Railroad	Port	Air transport
Belgium	6.2	5.8	6.3	6.1
Canada	5.9	5.3	5.8	5.9
France	6.5	6.6	6	6.4
Germany	6.4	6.2	6.5	6.6
Italy	3.6	3.5	3.2	4.4
Spain	4.8	4.4	4.4	5.3
UK	5.4	4.1	5.5	6.4
USA	6.4	4.8	6	6.6

Source: Global Competitiveness Report 2004-2005

When asked to evaluate the general distribution infrastructure of their country, Italian and Spanish executives are less satisfied than their counterparts in the other countries listed above (3.6 and 4.8 out of 7 respectively). Also, their assessment of the railway, port and air transport infrastructure is less positive. As to the overall infrastructure, the United Kingdom and Canada are in the middle group (5.4 and 5.9 out of 7 respectively), while in Belgium, the US, Germany and France the overall infrastructure got scores in the range 6.2 to 6.5 out of 7. Of all executives, the French were most satisfied with the railway infrastructure, the Germans with the port infrastructure and the Americans (together with the Germans) with the air transport infrastructure.

With regard to ICT infrastructure, and more in particular the infrastructure relating to the internet, the most obvious indicator is the penetration of internet access. Home internet access varies from 35% in Catalonia to 63% in Baden-Württemberg.

→ Table 26 Home internet access (in %), 2004

	% home internet access
Baden-Württemberg	62.8
Catalonia*	35
Flanders	51
Lombardy*	51
Maryland*	55
Nord-Pas-de-Calais*	43
Quebec	42.7
Rhône-Alpes	n.a.
Scotland	43

*: Catalonia, Lombardy, Nord-Pas-de-Calais: 2003; Maryland: 2001

Source: Regional statistics offices

→ Table 27 Enterprise access to internet (in %), latest available year

	% of enterprises	Year
Baden-Württemberg*	84	2002
Catalonia	86	2003
Flanders	97	2004
Lombardy*	83	2003
Maryland	n.a.	/
Nord-Pas-de-Calais*	58	2001
Quebec	70	2001
Rhône-Alpes*	58	2001
Scotland	75	2003

*: when no regional data were available, national data have been used

Source: Benchmarking Enterprise Policy: Results from the 2004 Scoreboard; Institut de la Statistique Quebec, Scottish E-Business Survey, INE, APS

Internet access within enterprises is of course more common than in individual households. The percentage of enterprises having access to the internet ranges from 58% in France to 97% in Flanders. The low percentage of French enterprises having access to the internet can partly be explained by the Minitel system that is widely used in France. This system was launched in 1982 and became very popular in France even before the breakthrough of the internet. It is said that in 2000 about 9 million Minitel terminals were in use. However, Minitel is slowly losing market share in favour of the internet. As the figures for France in Table 27 are only from 2001, it may be expected that this percentage has increased over the last few years. The same goes for Quebec, as these data also go back to 2001.

Although e-commerce is often mentioned as an important element in the competitive strategy of a firm, the share of turnover that results from e-commerce is negligible. Also, the percentage of enterprises that actively purchase and sell on the internet is relatively small. Firms in Belgium, the UK and to a lesser extent France and Germany seem much more involved in e-commerce than their counterparts in Spain and Italy[20].

→ Table 28 Importance of e-commerce, 2003

	% of enterprises on the internet		% of enterprise turnover
	Selling	Purchasing	from e-commerce
Belgium	19	13	1.8
Canada	n.a.	n.a.	n.a.
France	23	7	n.a.
Germany	10	8	0.7
Italy	3	2	0.3
Spain	2	1	0.3
UK	18	9	1.5
USA	n.a.	n.a.	n.a.

Source: Benchmarking Enterprise Policy: Results from the 2004 Scoreboard

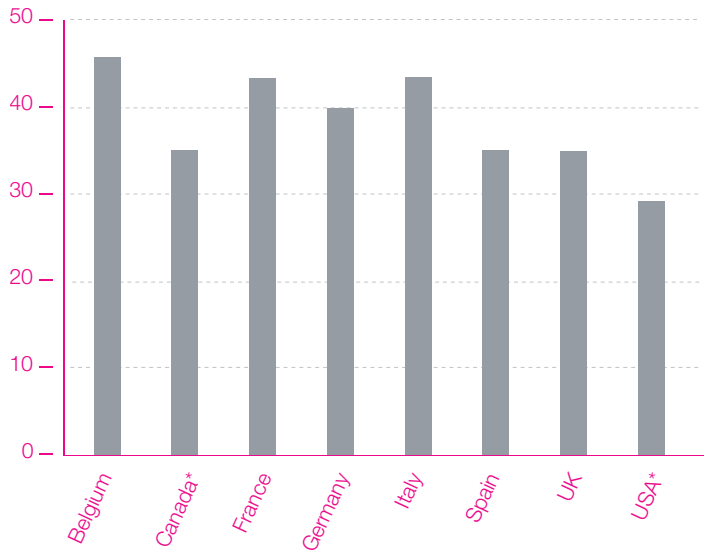
[20] / No regional comparable data were available.

6.1.2. Taxation

Besides infrastructure, the structure of the taxation system, taxation levels and the effective tax burden also play an important role in the location decisions of businesses. The level and type of taxation can either enhance or impair competitiveness and the creation of wealth. Since in most countries - if not all - taxation regulations fall within the ambit of the national government through the ministry of finance, we have chosen to analyse national rather than regional data. The following analysis shows a wide variation in national taxation systems.

The overall tax burden, which consists of all taxes and compulsory actual social contributions and is expressed as a percentage of GDP, indicates the share of a country's output that is collected by the government through taxes and as such can be seen as a measure of the degree to which the government controls the economy's resources (OECD, 2005). In the European counties observed the overall tax burden varied in 2003 from 35.6% in Spain to 45.7% in Belgium. In Canada and the United States total tax revenues accounted for 35.1 and 28.9% of GDP in 2001 respectively.

→ Figure 13 Total taxes (incl. social contributions) as % of GDP, 2003

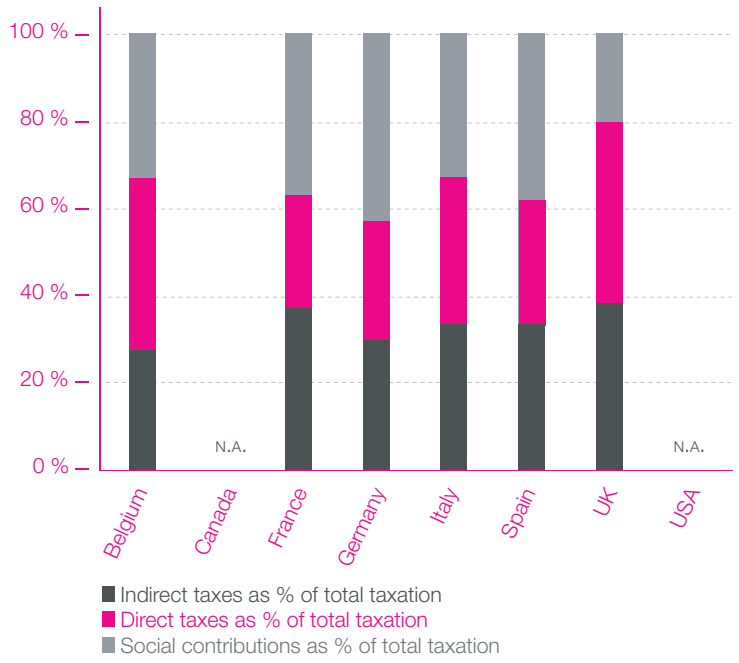


*: Canada and USA: 2001

Source: Structures of the taxation systems in the European Union 2005 Edition, Eurostat; US, Canada: OECD Fact book, 2005

Breaking down total tax revenues by major type of tax (direct taxes, indirect taxes and social security contributions), the United Kingdom makes least use of social security contributions and most of indirect and direct taxes, whereas in Germany social security contributions constitute the largest part of total taxes and the contribution of both direct and indirect taxes is relatively low.

→ Figure 14 Tax revenue breakdown, 2003

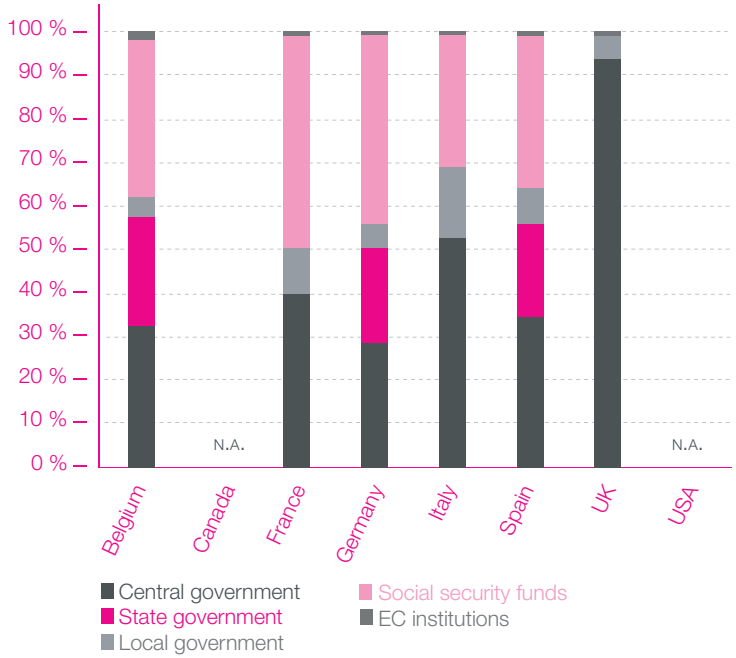


Source: Structures of the taxation systems in the European Union 2005 Edition, Eurostat

Total tax revenues can also be classified by the level of government receiving them. In the new ESA95 (European System of National and Regional Accounts), four levels of government are identified within a country in addition to the institutions of the European Union, namely the central (or federal or national) government, the state (or regional) government, the local (or municipal) government and social security funds. The shares of these levels of government represent not only tax revenues from taxes levied by that government itself, but also tax revenues that are transferred to it. The share of the different government levels as such conveys little information on discretion over tax rates and tax base.

The proportion of taxes that is received by regional government varies widely: in France, Italy and the United Kingdom it is inappreciable, whereas in Spain, Germany and Belgium it accounts for 20 to 24% of all tax revenues. In the former central government receives a larger part of all revenues than in the latter. Local tax revenues' share varies from 5% in the United Kingdom and Belgium to 16% in Italy. In the United Kingdom social security funds do not play a role in the distribution of tax revenues. In the other countries however, these funds' share is relatively high. Tax revenues received by the institutions of the European Union are negligible in all countries.

→ Figure 15 Tax revenue by receiving government, 2003



Source: Structures of the taxation systems in the European Union 2005 Edition, Eurostat

The indicators above may give a first insight into the structure of the taxation system, but they tell us little about the economic dimension of taxation. Therefore implicit tax rates (ITR) are calculated, which measure the effective tax burden on different types of economic income or activity. We observe here implicit tax rates on consumption, labour and capital, as these are the three major bases on which taxes can be levied. Each ITR thus expresses the revenues derived from taxation of these economic activities as a percentage of the total potential tax base afforded by that activity.

→ Table 29 Implicit tax rates on different types of economic income or activity, 2003

	Consumption	Labour	Capital
Belgium	21.5	43.2	29.5
Canada	n.a.	n.a.	n.a.
France	21.4	43.3	35.9
Germany	18.5	40.6	20.1
Italy	17	41.8	31.1
Spain	16.5	29.8	30.3
UK	21.8	24.6	28
USA	n.a.	n.a.	n.a.

Source: Structures of the taxation systems in the European Union 2005 Edition, Eurostat

ITR on consumption is lowest in Spain, and highest in the United Kingdom, whereas ITR on labour is lowest in the United Kingdom, and highest in France and Belgium. ITR on capital is lowest in Germany, and highest in France.

In addition to the ITR on labour, the tax burden on labour can also be measured by the so called tax wedge (the difference between the salary cost of an average production worker paid by the employer and the net wage the worker receives), which gives a second indication of the extent to which taxation discourages employment. In general both indicators tend to show a reasonably strong correlation. The OECD yearly publishes taxes on the average production worker as a percentage of labour cost, which makes it possible to include Canada and the United States in this indicator.

→ Table 30 Tax wedges, 2003

	Tax wedge
Belgium	54.5
Canada	32.4
France	48.3
Germany	52
Italy	45.3
Spain	37.6
UK	31.1
USA	29.5

Source: OECD, 2005

The tax wedge is smallest in the Anglo-Saxon countries (the US, UK and Canada). The share of taxes in labour cost is highest in Belgium and Germany.

6.1.3. Administrative environment

The administrative environment in which businesses have to operate can be distinguished as a third hard determinant in their location decisions, as it can either encourage or dampen entrepreneurship. Authorities can, for example, simplify regulations, shorten times needed to deal with administration or strengthen the protection of property rights.

As most of the data related to the quality of the administrative environment are only available on a national level and as regional competences in the field of business regulations differ between countries, we present national data here.

Doing Business – a joint initiative of the World Bank and the International Finance Corporation – compares the regulatory costs of doing business in up to 155 economies and makes up an ease of doing business ranking[21]. High ranking indicates that the government has created a regulatory environment conducive to business activities.

The ease of doing business ranking consists of ten processes related to doing business: starting a business, dealing with licenses, hiring and firing workers, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a business. For each of these processes all countries are ranked according to their results on several sub-indicators (e.g. for starting a business these sub-indicators are the number of procedures, the time, cost and minimum capital needed to open a new business). To get more insight into the composition of the ease of doing business index and the performance of all countries on each sub-indicator, we refer to appendix B.

Of all countries that have a region in the DC Network, the United States ranks highest, followed by Canada (4) and the United Kingdom (9) in the top 10. Italy is ranked only 70th , but well before China (91) and India (116).

→ Table 31 Ease of doing business, 2005

	Ease of doing business ranking
Belgium	18
Canada	4
France	44
Germany	19
Italy	70
Spain	30
UK	9
USA	3

Source: Doing business in 2006, World Bank and the International Finance Corporation

[21] / It should be noticed that the index is relatively limited in scope, as it only takes into account business regulations and red tape. It does for example not account for macroeconomic conditions, the quality of infrastructure or the proximity to large markets.

KARNATAKA: ADMINISTRATIVE SIMPLIFICATION THROUGH E-GOVERNANCE

The government of Karnataka has recently adopted several initiatives in the field of administrative simplification through e-governance. We mention two of these below.

Bangalore One (B1)

As of April 2005 Bangalore citizens can make use of Bangalore One, a one-stop interface for payment of government dues. Taxes, utility bills, police fines, copies of birth and death registration certificates, registration of motor vehicles, passport applications, etc. can all be registered and paid for by computer in 15 service centres spread over the city of Bangalore or, when registered, from home. Up to now, B1 provides 24 basic services of 8 government departments.

Bangalore One – a public private partnership – is based on a phased approach. In the (near) future the number of service centres as well the number of government-to-citizen (G2C) services will be further elaborated. Next to these G2C services, the portal will also offer government-to-business (G2B) services which are foreseen to considerably smoothen the government process with respect to business procedures, and business-to-citizen (B2C) services, for example the on line viewing and paying of bills from private companies.

The vision of the B1 project is "to provide to the citizens of Karnataka all G2C and G2B one-stop services and information of departments and agencies of central, state and local governments in an efficient, reliable, transparent and integrated manner on a sustained basis, through easy access to a chain of computerized Integrated Citizen Service Centers (ICSC's) and through multiple delivery channels like electronic kiosks, mobile phones and the Internet".

Although the performance of this e-governance project still is to be evaluated, it is expected to be successful (the more when all technical difficulties are cleared and the service offer is further extended). B1 enhances not only the productivity of the administration and the speed, transparency and accountability of its services, but also the convenience and responsiveness to citizen's needs as it obviates the need for citizens and businesses to visit the government offices except for specialized and complex services.

Kaveri

Kaveri (Karnataka Valuation and E-registration) is another e-governance project initiated by the government of Karnataka on a public private partnership basis. The registration of property documents, done by the Department of Registration and Stamps, can now be executed in only 45 minutes, whereas before it took more than one month.

The private partner installs, operates and maintains hardware across all offices and recovers his investments from service fees charged to the client, while the Department of Registration and Stamps provides all software and manpower needed at the front end.

By computerization and making use of touch screen interfaces at automated kiosks, the government of Karnataka has increased transparency in transactions, eliminated scope for corruption and drastically reduced waiting times for customers.

Source: http://www.bangaloreone.gov.in; http://www.karnataka.com/govt/bangaloreone.shtml; http://www.karigr.org

6.2. Soft location factors

Soft location factors are perceived as increasingly important in determining the location of businesses. Furthermore, these factors are essential in attracting creative and highly talented citizens.

One element that without a doubt is an important soft location factor is the prevalent social capital. Social capital includes social networks, conventions, attitudes, norms, values, routines and beliefs and is to a large extent the product, most frequently unintended, of past and current patterns of economic and social everyday activity. The norms, values and beliefs that are sustained in social interaction reflect this past history of development. It may be that, even when these norms and values have been beneficial to economic development in the past (which clearly has not always been the case), they may cease to do so when economic circumstances change significantly. Hence the current stock of social capital may constrain adaptation to the actions needed to face the challenges posed to Western economies in the 21st century effectively; in other words, Western economies may suffer from 'path dependency' (OECD, 2001a).

In the creative knowledge economy, the attitude towards entrepreneurship and diversity plays a fundamental role and is briefly analyzed here. Other aspects of social capital that are important in this new economy include the attitude towards (lifelong) learning, cooperation and trust. Many surveys of social capital have already been conducted, most if not all of them in a national context. Because comparable regional data were not available for all regions, we once more make use of national data.

Besides aspects of social capital, other soft location factors examined here are the objective and subjective feeling of (un)safety and the attractiveness of a region through its cultural scene.

6.2.1. Entrepreneurial attitude

To analyse the prevailing entrepreneurial attitude we have selected some of the data gathered by the Flash Eurobarometer Entrepreneurship covering all European countries and the United States.

In the United States a clear majority prefers being self-employed to being an employee. The same, although the majority is a little smaller, holds for Spain and Italy. In France, the United Kingdom, Germany and Belgium the contrary is true.

→ Table 32 Preference employee versus self-employed (%), 2004

	Employee	Self-employed	None of these	DK/NA
Belgium	58	34	5	2
Canada	n.a.	n.a.	n.a.	n.a.
France	55	42	1	1
Germany	56	39	2	3
Italy	42	55	2	1
Spain	34	56	2	8
UK	55	41	2	1
USA	34	61	3	2

Source: Flash Eurobarometer Entrepreneurship nr. 160, 2004

Stability of employment and – linked to it – regularity of income and more beneficial social security insurance are often mentioned as major reasons for preferring working as an employee.

In most regions the prevalent risk-averse mentality, which can be seen as the underlying factor that inspires the preference for stable employment, deters people from being self-employed. In Germany, Belgium and Italy a majority agrees that one should not start a business if there is a risk it might fail. In the other observed European countries, this percentage is a little lower, but still far larger than in the United States.

→ Table 33 Risk aversion (%), 2004

"One should not start a business if there is a risk it might fail"	Agree	Disagree	DK/NA
Belgium	52	45	3
Canada	n.a.	n.a.	n.a.
France	43	56	1
Germany	61	37	2
Italy	51	49	0
Spain	44	50	6
UK	43	53	4
USA	33	65	2

Source: Flash Eurobarometer Entrepreneurship nr. 160, 2004

Besides the reasons mentioned above, self-employment is also restrained by lack of financial means, an entrepreneurial idea, time or skills. Moreover, the administrative burden can also form an obstacle to self-employment.

6.2.2. Attitude towards diversity

Diversity in population, economic activities, ... is seen as a very important spur to regional creativity. When people of different ages, nationalities, cultural backgrounds, mindsets, ... meet, this stimulates new combinations of ideas and views. But diversity in itself is not a sufficient condition for creativity, it has to be combined with an open and tolerant attitude.

The openness of the population towards diversity has been measured by the European Monitoring Centre on Racism and Xenophobia (EUMC) among others. Unfortunately, no comparable data were available for the United States and Canada.

→ Table 34 | Attitude towards diversity, 2000[22]

"People from minority groups are enriching cultural life in your country"

	Tend to agree	don't know	Tent to disagree
Belgium	45	11	44
Canada	n.a.	n.a.	n.a.
France	52	10	38
Germany	51	17	33
Italy	52	15	33
Spain	53	17	30
UK	43	19	39
USA	n.a.	n.a.	n.a.

"Country's diversity in terms of race, religion and culture adds to its strenghts"

	Tend to agree	don't know	Tent to disagree
Belgium	37	13	50
Canada	n.a.	n.a.	n.a.
France	54	13	33
Germany	39	16	45
Italy	41	20	39
Spain	48	23	30
UK	51	19	30
USA	n.a.	n.a.	n.a.

Source: Attitudes towards minority groups in the European Union: a special analysis of the Eurobarometer 2000 survey, EUMC

[22] / As a rule of thumb, differences of 6% can be assumed to be statistically significant.

The share of citizens agreeing with the proposition that people from minority groups enrich cultural life is slightly larger than that of citizens disagreeing, although the share of 'don't know' answers is relatively large. In Belgium, disagreement is highest. With regard to the second proposition, a country's diversity in terms of race, religion and culture adds to its strengths, only in Belgium and Germany the share of citizens who disagree is larger than that who agree, although also here the percentage of people who 'don't know' is rather high.

6.2.3. Crime and safety

When thinking about soft location factors, we soon come to all the intangible factors that make up the quality of life in a certain region. Safety is surely one of these. One can make a distinction between objective safety, for example based on crime statistics gathered by the police, and the subjective perception of the inhabitants, which is based upon personal feelings and experiences as well as on the objective incidence of crime.

Of all regions for which data were available, the crime rate (the number of violent and property crimes per 1,000 inhabitants per month) is lowest in Maryland and highest in Flanders and Scotland.

→ Table 35 Crime rates, latest available year

	Crimes per 1,000 inhabitants per month	Year
Baden-Württemberg	n.a.	/
Catalonia	n.a.	/
Flanders	6.6	2002
Lombardy	n.a.	/
Maryland	3.8	2003
Nord-Pas-de-Calais	5.9	2002
Quebec	5.4	2004
Rhône-Alpes	n.a.	/
Scotland	6.7	2003

Source: APS; Bureau of Justice Statistics USA; Institut de la Statistique du Québec; INSEE; Scottish crime survey 2003

The quality of life perceived by residents is affected not only by the objective crime rate, but also by the subjective feeling of unsafety, usually measured by means of survey questions, such as 'How safe do you feel walking in the area where you live after dark?'.

The percentage of people not feeling safe when walking alone in their neighbourhood after dark ranges from 26% in Germany to 42% in Italy and the UK.

→ Table 36 Percentage of people not feeling safe when walking alone after dark, 2002

"How safe do you feel walking in the area where you live after dark?"	Unsafe
Baden-Württemberg*	26
Catalonia*	34
Flanders*	32
Lombardy*	42
Maryland	n.a.
Nord-Pas-de-Calais*	34
Quebec**	28
Rhône-Alpes*	34
Scotland**	32

*: Country data

**: Quebec: 1999; Scotland: 2003

Source: Public Safety Special Eurobarometer nr. 58, 2003 (data 2002); Scottish crime survey 2003, Portrait social du Québec 1999

6.2.4. Arts and culture

Besides safety, the presence of attractive recreational facilities and a lively cultural scene definitely has a positive effect on the perceived quality of life. It offers people the opportunity to meet and exchange ideas and as such fosters creativity.

Unfortunately it has proved very difficult to find comparable regional data on the presence of arts and culture in the DC regions. Moreover, as large regional differences in cultural activity may exist within one country, it is not very instructive to use national data.

In this respect it might be useful for the DC regions to collect standardized information in the future. One indicator that seems of special importance is the cultural expenditure of regional and other governments. Others that could be interesting are, for example, the proportion of frequent participants of cultural events in the total population or the number of stage performances per municipality.

7 INNOVATION[23]

The promotion of innovation is at the top of the social, political and economic agenda. During the past decade, governments have been increasingly active in attempting to put together the necessary ingredients for realizing endogenous growth, based on the innovative capacity and entrepreneurial dynamics that can be mobilized in a particular region (Nauwelaers, 2005). Since its inception (Freeman, 1987) the concept of innovation systems has gained wide popularity in both research and policies on (technological) innovation. The increasing recognition of innovation as a dynamic process involving mutual and multi-functional interactions with a varied and organizationally structured environment has been made explicit by the term "innovation system" and emphasizes the central role of innovation in economic development and as an engine of economic growth. Additionally, Richard Florida observed the critical importance of regions in contributing to these goals: *"despite continued predictions of the 'end of geography', regions are becoming more important modes of economic and technological organization in this new age of global, knowledge-intensive capitalism" (Florida 1995: 528).*

Indicators on science, technology and innovation have gained much political interest in Europe, especially since the Lisbon European Council 2000 and the Barcelona European Summit in 2002. In Lisbon it was decided that 'the EU should become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion.' In Barcelona the European Council remarked that, in order to reduce the technological gap between the European Union and the United States and Japan, augmenting R&D expenditure and innovation in the EU would be inevitable. The EU governments agreed to the proposal to increase R&D expenditure to 3% of GDP by 2010. Two thirds of this expenditure is to come from the private sector.

In 2005 the European Spring Council identified 'knowledge and innovation for growth' as one of the three major domains of the future Lisbon Action Programme. Efforts are to be directed to creating an environment that encourages research, development and innovation, thus facilitating the transition to a knowledge economy. Several regions of the EU have also subscribed to attain an R&D intensity rate of 3%. Such a policy requires statistical monitoring of science, technology and innovation.

The next section discusses a number of widely used indicators related to innovation. We present a number of input as well as output measures of innovation. Unfortunately, this chapter has only provided an introduction to the main indicators of innovative activity in the European DC regions. Data for the non-EU DC regions were only available to a limited extent and where available, they were not comparable to the data for the European regions.

[23] / This chapter is the result of contributions by the following authors: André Spithoven, Nathalie Moray and Bart Clarysse.

7.1. R&D expenditure and R&D intensity

The main indicator, R&D intensity or R&D expenditure as a percentage of gross regional product, is shown for all European DC regions. The breakdown of R&D expenditure by sector shows different patterns depending on the institutional sectors concerned. These are the public sector composed of the government sector (GOVERD) and higher education (HERD). The private sector consists of the business enterprise sector (BERD) and the private non-profit organisations (PNP). In a European context the latter are almost negligible in terms of their level of R&D expenditure. Hence they are not considered in the remainder of this text.

→ Table 37 R&D expenditure by sector of performance (in million Euro), 2003

	Gross expenditure on R&D (a) (b)	Business expenditure on R&D (c)	Government expenditure on R&D (c)	Higher education on R&D (c)
Baden-Württemberg	12,301	9,750	1,217	1,334
Catalonia	1,875	1,244	170	456
Flanders	3,273	2,376	261	600
Lombardy	3,263	2,159	226	754
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	539	249	39	251
Quebec	3,354	1,972	266	1,116
Rhône-Alpes	3,647	2,476	403	768
Scotland	1,976	753	392	831

(a) Due to lack of data on the PNP, the GERD is not equal to the sum of the BERD, HERD, GOVERD

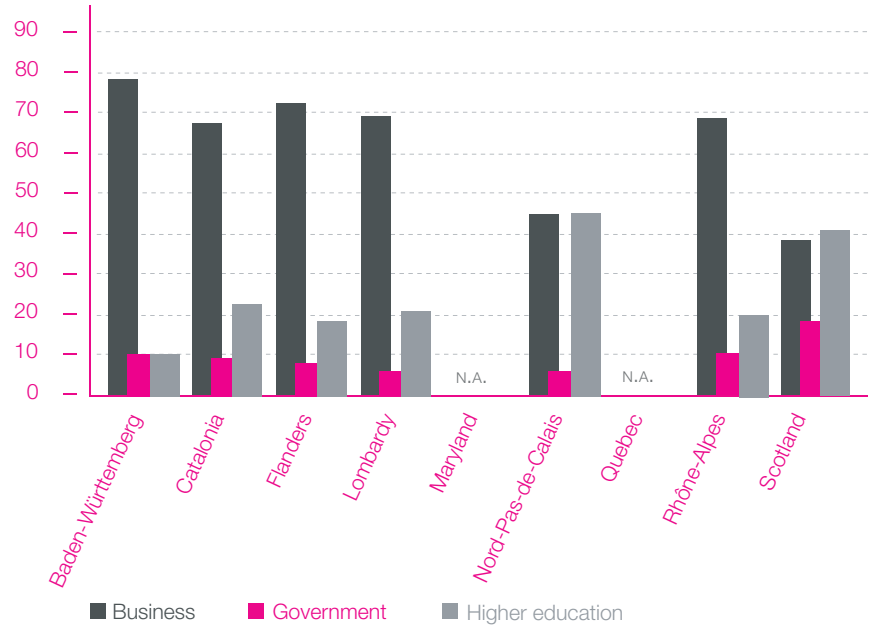
(b) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2002: Quebec. 2001: Nord - Pas-de-Calais; Rhône-Alpes. 1999: Scotland

(c) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy; Scotland. 2002: Quebec. 2001: Nord - Pas-de-Calais; Rhône-Alpes.

Source: Flanders: CFS/STAT 2005; Quebec Institut de la Statistique du Québec; Other regions: Eurostat 2005

Table 37 shows the difference in size of the European DC regions: Baden-Württemberg accounts for 46% of all their R&D expenditure. This is partly due to the selection criteria. with a 12% share of German R&D, Stuttgart, which is part of Baden-Württemberg, actually takes second place out of all German regions. Catalonia, with 23% of Spanish R&D spending the second region in terms of R&D expenditure after Madrid (32%), has far less weight in Europe. Flanders accounts for 63% of Belgian R&D expenditure. Lombardy too leads the Italian regions with 22% of Italian R&D spending. In France, the leading region is, of course, Île de France (with Paris as its capital) with 42%. Rhône-Alpes comes in second with 12%. Nord-Pas-de-Calais is not among France's top 3. Figure 16 depicts the shares of the different actors in the regional innovation systems. In European member states government and higher education are both part of the public sector.

→ Figure 16 R&D performance by sector - in share of total of all three sectors (%), 2003



Source: Flanders: CFS/STAT 2005; Other regions: Eurostat 2005

Figure 16 brings out the different organisation of regional innovation systems. Scotland and Nord-Pas-de-Calais have more than 50% R&D investments in the public sector (predominantly higher education). Looking at the regional wealth (GDP per capita, see Table 6), both regions are at the lower end of the GDP spectrum. Baden-Württemberg – one of the wealthiest DC regions in Europe – is the one that relies most on private initiative in R&D spending. Experience in France – Rhône-Alpes (private) and Nord-Pas-de-Calais (public) – shows that the different innovation systems are indeed a regional issue.

During the Lisbon and Barcelona European Summits, a target of spending at least 3% of GDP on R&D by 2010 was set. Several regions followed this debate and directed their science and technology policy and augmented efforts to achieving the 3% target.

→ Table 38 R&D intensity by sector of performance - R&D expenditure in % of gross regional product, 2003

	Gross expenditure on R&D (a) (b)	Business expenditure on R&D (c)	Government expenditure on R&D (d)	Higher education on R&D (d)
Baden-Württemberg	3.89	3.08	0.41	0.42
Catalonia	1.27	0.86	0.11	0.30
Flanders	2.12	1.54	0.17	0.36
Lombardy	1.16	0.86	0.12	0.19
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	0.70	0.32	0.05	0.33
Quebec	2.71	1.59	0.22	0.90
Rhône-Alpes	2.58	1.75	0.28	0.54
Scotland	1.72	0.75	0.28	0.69

(a) Due to the different time periods and lack of most data on the PNP, the percentage of GERD as a share of gross regional product, is not equal to the sum of the shares of BERD, HERD, GOVERD.

(b) 2003: Flanders. 2002: Catalonia, Quebec; 2001: Baden-Württemberg; Nord - Pas-de-Calais; Rhône-Alpes. 2000: Lombardy. 1999: Scotland.

(c) 2003: Flanders. 2002: Catalonia, Quebec; Scotland. 2001: Baden-Württemberg; Nord - Pas-de-Calais; Rhône-Alpes. 2000: Lombardy.

(d) 2003: Flanders. 2002: Baden-Württemberg; Catalonia; Scotland. 2001; Nord - Pas-de-Calais; Rhône-Alpes. 2000: Lombardy.

Source: Flanders: CFS/STAT 2005; Quebec: Institut de la Statistique du Québec; Other regions: Eurostat 2005

At present only Baden-Württemberg spends more than the 3% target on R&D. In that region business alone already spends more than 3% of GDP on R&D. All other regions still have much to do to reach this target by 2010. Four of the seven do not even reach half of the 3% target. The position of Nord-Pas-de-Calais in particular needs special attention: R&D intensity in this region is currently among the lowest in the EU. Note that data for some regions are older than for others, possibly explaining part of the low percentage in those regions. In all regions but Nord-Pas-de-Calais, business is by far the biggest spender in R&D. Only in Nord-Pas-de-Calais R&D spending is larger in higher education than in business.

7.2. R&D personnel

Since R&D is a highly knowledge intensive activity, the major input in the R&D process is provided by people. This can be readily seen from the cost structure of R&D expenditure where the share of labour costs of R&D personnel is the highest when compared to the other categories of current costs and capital expenditure (about 60%).

→ Table 39 R&D personnel - in full time equivalent, 2003

	All sectors (a) (b)	Business sector (c)	Government sector (c)	Higher education (b)
Baden-Württemberg	102,995	76,456	12,109	14,430
Catalonia	33,411	18,010	3,580	11,678
Flanders	31,844	20,454	2,415	8,610
Lombardy	29,428	18,750	2,263	6,912
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	7,301	2,962	544	3,795
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	35,892	21,510	4,121	10,256
Scotland	n.a.	7,363	2,868	n.a.

(a) Due to lack of data on the private non-profit sector, the data in all sectors is not equal to the sum of the business and government sectors and higher education

(b) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes

(c) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy; Scotland. 2001: Nord - Pas-de-Calais; Rhône-Alpes

Source : Eurostat 2005

Although this indicator is clearly different from R&D expenditure, similar conclusions can be drawn about the general predominance of the private sector and the specific regional differences in the organisation of regional innovation systems.

Another difference in using the R&D personnel is that it uses real (as opposed to nominal or monetary) variables. The proportion of R&D personnel in employment is more or less the 'real' equivalent of R&D intensity (Table 40).

→ Table 40 Share of R&D personnel in employment - in %, 2003

	All sectors (a) (b)	Business sector (c)	Government sector (c)	Higher education (b)
Baden-Württemberg	2.64	1.66	0.28	0.70
Catalonia	1.74	0.79	0.17	0.78
Flanders	1.24	0.80	0.09	0.34
Lombardy	1.13	0.55	0.18	0.34
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	0.76	0.24	0.05	0.47
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	2.03	1.06	0.22	0.76
Scotland	n.a.	n.a.	0.13	n.a.

(a) Due to lack of data on the private non-profit sector, the data in all sectors is not equal to the sum of the business and government sectors and higher education

(b) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes

(c) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy; Scotland. 2001: Nord - Pas-de-Calais; Rhône-Alpes

Source : Eurostat 2005

Table 40 only confirms the proposition that most R&D expenditure is on R&D personnel: there is not much difference between the rankings in Table 38 and Table 40. However, the R&D intensity in Flanders is 2.12 against 1.27 in Catalonia. Yet in real terms (Table 40) the ranking differs considerably (1.24 in Flanders and 1.74 in Catalonia). Further investigation is needed to reveal differences in efficiency of R&D in these regional innovation systems.

Three groups of R&D personnel can be distinguished. First, researchers are defined as “professionals engaged in the conception and creation of new knowledge, products, processes, methods and systems and also the management of the projects concerned” (OECD 2002: 93). Second, non-researchers, like technicians and other supporting staff, are also considered as R&D personnel. The former perform tasks such as bibliographic searches, preparing computer programmes, carrying out experiments, tests and analyses, recording measurements; etc. Third, the other supporting staff comprise those persons participating in R&D projects in an administrative or unskilled capacity. Table 41 zooms in on the researcher group, and Table 42 relates them to the total R&D personnel.

→ Table 41 Researchers - in full time equivalents, 2003

	All sectors (a) (b)	Business sector (c)	Government sector (b)	Higher education (b)
Baden-Württemberg	61,458	45,841	6,069	9,548
Catalonia	18,387	6,898	2,489	8,905
Flanders	18,447	10,427	1,327	6,505
Lombardy	13,965	7,993	1,190	3,894
Maryland	N.A.	N.A.	N.A.	N.A.
Nord-Pas-de-Calais	4,129	1,191	262	2,676
Quebec	N.A.	N.A.	N.A.	N.A.
Rhône-Alpes	19,725	10,314	2,216	7,192
Scotland	N.A.	4,445	N.A.	N.A.

(a) Due to lack of data on the private non-profit sector, the data in all sectors is not equal to the sum of the business and government sectors and higher education

(b) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes

(c) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes; Scotland

Source : Eurostat 2005

→ Table 42 Share of researchers in total R&D personnel - in %, 2003

	All sectors (a) (b)	Business sector (c)	Government sector (b)	Higher education (b)
Baden-Württemberg	59.7	60.0	50.1	66.2
Catalonia	55.0	38.3	69.5	76.3
Flanders	57.9	51.0	54.9	75.5
Lombardy	47.5	42.6	52.6	56.3
Maryland	N.A.	N.A.	N.A.	N.A.
Nord-Pas-de-Calais	56.6	40.2	48.2	70.5
Quebec	N.A.	N.A.	N.A.	N.A.
Rhône-Alpes	55.0	47.9	53.8	70.1
Scotland	N.A.	60.4	N.A.	N.A.

(a) Due to lack of data on the private non-profit sector, the data in all sectors is not equal to the sum of the business and government sectors and higher education

(b) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes

(c) 2003: Flanders; Baden-Württemberg; Catalonia; Lombardy. 2001: Nord - Pas-de-Calais; Rhône-Alpes; Scotland

Source : Eurostat 2005

Again marked differences in regional innovation systems come to the fore: Baden-Württemberg has the highest proportion of researchers among R&D personnel, Lombardy the lowest. Catalonia has the lowest proportion of researchers among R&D personnel in the business sector whereas Scotland has the highest. All regions have the highest proportion in the higher education. But the variation over the three sectors of R&D performance in the regional innovation system is lowest in Lombardy.

7.3. Patents

An important output indicator of innovative activity is documented by the patent system. Under this system the inventor of a new product or process can assign the rights embodied in the patents to a third party, usually the organisation where he or she is employed. Patents are an indicator of the capacity of a region to exploit knowledge and to translate it into potential economic gains. Therefore, patent statistics and indicators are widely acknowledged as output indicators linked to R&D and innovation and are used to assess the inventive performance of the country or region. We consider the patent applications filed at the European Patent Office (EPO). The most recent year for which non-provisional data are available is 2002. Table 43 shows the number of patent applications and their growth. To correct for the size of the region the number has been related to the employment and population data.

→ Table 43 | Number and evolution of EPO patent applications, 1999-2002

	Filed patents (EPO)	Evolution 1999-2002 in % (a)	Patents per million employed	Patents per million capita
Baden-Württemberg	6,382	6.27	1,221.3	602.1
Catalonia	462	9.76	150.7	72.8
Flanders	965	1.68	364.7	161.5
Lombardy	1,612	4.79	385.4	178.4
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	175	-2.57	104.4	43.5
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	1,498	5.64	587.0	259.7
Scotland	491	n.a.	193.0	95.3

Note: (a) average annual growth

Source: Eurostat 2005

When looking at the innovative output, and comparing these with the tables on the input measures such as R&D expenditure, the case of Lombardy stands out. Although the R&D intensity of the region is 'only' 1.16%, the output is second highest in terms of patent applications, and still growing fast. One would expect that Baden-Württemberg had a moderate growth rate in view of the high level of patent applications. Yet this is not the case, nor is it when the number of patents is related to the employed (1,221.3 per million) or the population (602.1 per million). The fact that the region has the highest R&D intensity might be one element in the explanation for this. Rhône-Alpes, also with a high R&D intensity, is also a very dynamic region when it comes to innovative output. Flanders however, which also has - with 2.12% - a relatively high R&D intensity, shows a very moderate growth indicating some problems in the translation of innovative inputs into innovative outputs. The most dynamic region in terms of innovative output is Catalonia, but as the number of patents is still fairly low this can be interpreted as catching up with other regions. Nord-Pas-de-Calais is a region in which the innovative output is not only fairly low, but also shows a negative trend.

It is common practice to focus on high tech activities when probing into the degree of innovativeness of a region. These high tech patents relate to economic activities with a high degree of knowledge intensive content. These activities are: computer and automated business equipment; micro organism and genetic engineering; aviation; communication technology; semiconductors; and lasers. Table 44 shows analyses similar to those in Table 43, but for high tech patents only.

→ Table 44 | Number and evolution of EPO high tech patent applications, 1999-2002

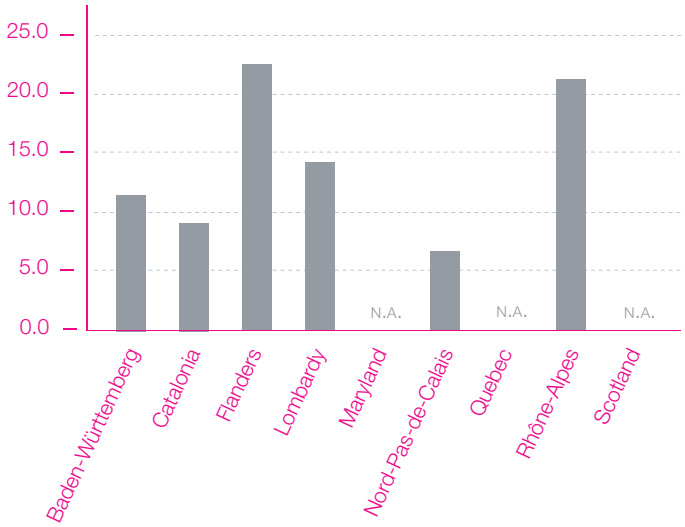
	High tech patents (EPO)	Evolution 1999-2002 in % (a)	High tech patents per million employed	High tech patents per million capita
Baden-Württemberg	753	10.21	144.0	71.0
Catalonia	44	5.94	14.4	6.9
Flanders	222	6.92	84.0	37.2
Lombardy	225	11.18	53.7	24.9
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	12	-16.27	7.4	3.1
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	317	7.83	124.1	54.9
Scotland	n.a.	n.a.	n.a.	n.a.

Note: (a) average annual growth

Source: Eurostat 2005

Several differences appear when comparing Table 43 and Table 44. The observed catching up phenomenon by Catalonia disappears in the case of high tech innovative output. Lombardy on the other hand performs very well in high tech activities. Figure 17 relates Table 43 and Table 44 to one another, showing the percentage of high tech patents filed related to the total number of patents.

→ Figure 17 High tech patents filed as a percentage of the total number of patents, 2002



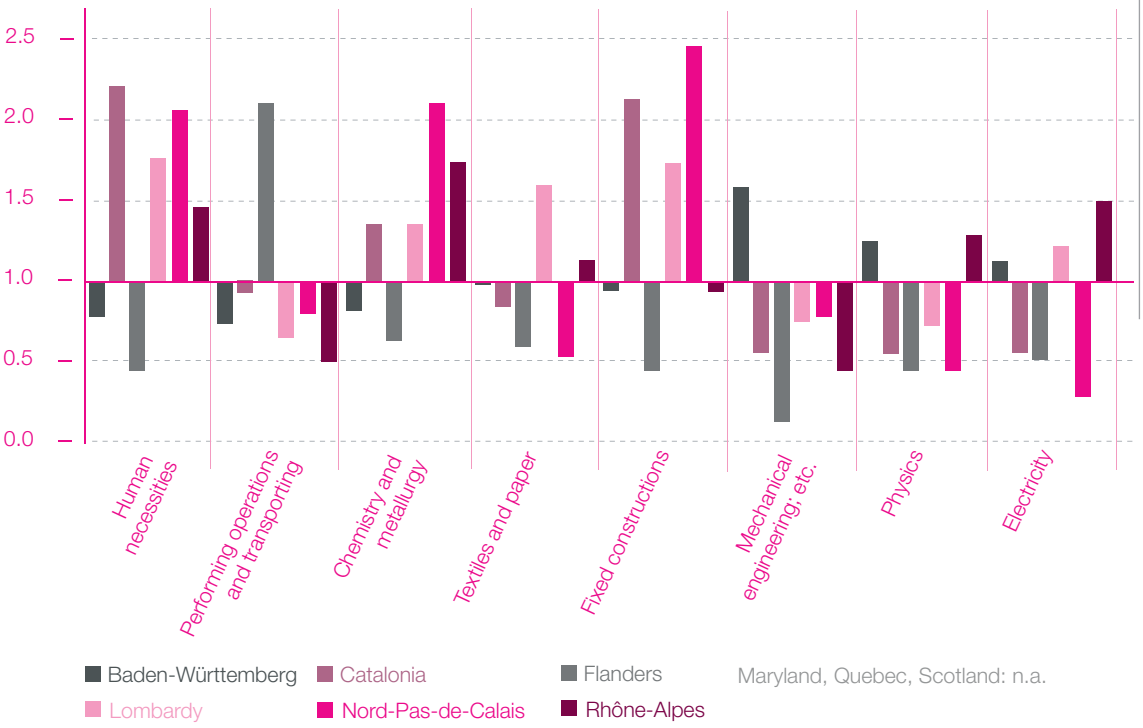
Source: Eurostat 2005

It clearly shows that the innovative output in Flanders – although only moderate in number – is characterised by a substantial degree of high tech output. Rhône-Alpes also scores very high in this respect.

Another point of interest is the technological domains in which the regions have a competitive edge. The domains are based on the aggregation of patents following the International Patent Classification (IPC). In this paper we have calculated the index of revealed technological advantage[24]. The index can take a value between 0 and infinity. A value that is smaller than 1 means a comparative disadvantage in the specified technological domain. A value larger than 1 points to a comparative advantage and unity refers to neutrality in this technological domain. The results are shown in Figure 18.

[24] / The revealed technological advantage is calculated using the formula:
(Pij / ∑iPij) / (∑ijPij) with i = 1-8 number of technology specialisations and j = 1-6 number of regions (there are no reliable data for Scotland).

→ Figure 18 Index of revealed technological advantage in different domains, 2002



Source: Eurostat 2005

Several observations can be made. First, Flanders has an explicit technological advantage in performing operations and transporting. For all the other technological fields the region has a disadvantage compared to the other European DC regions. As could be expected on the basis of the techno-economic structure, Lombardy is specialised in textiles (and paper). The well documented innovative Italian industrial districts are the main reason for this result. Due to its weight, the revealed (dis)advantages of Baden-Württemberg are less apparent, but therefore not less important: the region performs very well in the technological field of mechanical engineering, lighting, heating, weapons and blasting; and in the fields of physics and electricity. Both of these technological fields are also prominent in Rhône-Alpes, but – as already indicated earlier – this region is characterised by a diversity of industrial sectors.

7.4. Revenues from new products

Another major output indicator for innovative activity is the percentage of revenues that companies generate from new products that have been developed and successfully launched. The reason why this is important is that radically new products have most potential to create or increase local market demand and the propensity to be interesting as an export product, both factors believed to be significantly contributing to economic growth. However, these figures are only available at the country level, from the CIS survey. The data in Table 45 therefore pertain to the countries that host the European DC regions.

→ Table 45 | Product innovation and share of turnover

	Firms introducing new or improved products not new on the market - in %	Firms introducing new or improved products new to the market - in % of total	Revenue of new or improved products not new to the market - in %	Revenue of new or improved prosucts new to the market - in %
Belgium	80.4	36.1	19.2	7.0
Canada	n.a.	n.a.	n.a.	n.a.
France	70.2	34.4	16.0	7.8
Germany	69.3	30.5	27.4	7.3
Italy	67.7	54.7	25.3	14.9
Spain	66.4	34.0	25.2	12.4
UK	n.a.	27.5	n.a.	n.a.
USA	n.a.	n.a.	n.a.	n.a.

Source: Eurostat 2005

The first column shows the share of product innovators in the national economy. The term 'new' has to be interpreted as new to the enterprise, not new to the market. Belgium leads, and given that the Flemish region is the most dynamic in the Belgian national context, we can assume that most of the innovative activities stem from that region. The second column looks at the radical innovators and sees whether their products are new to the market. This share is an indicator for the 'radicalness' or 'disruptiveness' of the innovation. Here the exceptional score of Italy (54.7%) is in need for further clarification. Again, Flanders scores well in the number of radical innovators.

Columns three and four are indicators that pertain to the commercialisation of these new or significantly improved products as they show the share of revenue that is earned from incremental (products not new to the market but new to the enterprise) and radical (products new to the market) innovation. The data show that, although Belgium has many firms involved in innovation, the commercialisation of these innovations is far less successful, especially for radical innovations. Within Belgium however,

data from the Steunpunt O&O (2005) show that the problems in commercialisation are mainly concentrated outside of Flanders. Specifically looking at Flanders' position, revenues of new or improved products new to the market are about 20% of total turnover, putting Flanders at the top within the EU. Next to Belgium also France seems to have difficulty in translating its innovations into commercial successes. Italy and Spain on the other hand seem much more successful in the commercialisation of their innovative products.

7.5. Summary and challenge

This chapter provided an introduction to the main indicators relating to innovative activity in the European DC regions. Unfortunately, data for the other DC regions were not available on a comparable basis.

Our analysis displays some clear differences in the regional innovation systems, with investments in R&D ranging from 3.9% of GDP in Baden-Württemberg to only 0.7% of GDP in Nord-Pas-de-Calais. Regional innovation systems are very differently organised: some of them rely on the private business sector (Baden-Württemberg, Flanders, Rhône-Alpes and Lombardy), others on higher education (Scotland, Nord-Pas-de-Calais). In terms of R&D intensity the government sector is particularly weak in Nord-Pas-de-Calais, Catalonia, Lombardy and Flanders. Also in terms of R&D personnel marked differences emerged: Baden-Württemberg has the highest share of researchers in R&D personnel, Lombardy the lowest. Catalonia has the lowest share of researchers in R&D personnel in the business sector, whereas Scotland has the highest share. All regions have most R&D personnel in higher education.

For the output indicators, we focused our discussion on patents and revenues from new products, although for the latter only national data are available. In terms of patents, the case of Lombardy stands out. Although the R&D intensity of the region is 'only' 1.16%, the output is second highest in terms of patent applications, and still growing fast. Both Baden-Württemberg and Rhône-Alpes are at the top of patent applications, both regions with a high R&D intensity. But Flanders, which also has, with 2.12%, a relatively high R&D intensity shows a very moderate growth indicating some problems in the translation of innovative inputs into innovative outputs. Moreover, Flanders (Belgium) also shows difficulty in commercialising the innovative efforts. Nord-Pas-de-Calais is a region in which the innovative output is not only fairly low, but also shows a negative trend.

An appropriate set of indicators is of vital importance in increasing our understanding of regional innovation systems so as to implement policy to boost R&D and innovation. However, how these indicators can be positively influenced by regional science, technology and innovation policy is a very complex question. One of the reasons for this is the changing nature of how knowledge production and innovation occurs, which is difficult to capture in traditional measures.

The most pervasive characteristic is the development of networked innovation systems and networked R&D. Established firms, SMEs, universities and research centres increasingly have to take into account that they are embedded in diffuse and distributed innovation processes (Leijten, 2005). The keyword is Open Innovation, implying that R&D increasingly takes place in collaborative projects and programmes including a variety of actors. Another parallel development is the changing nature of science, technology and innovation. First, a number of trends seem to operate concurrently: (1) pressures toward

user oriented approaches with shorter time to market horizons and (2) growing expectations from long term fundamental research in new, expected breakthrough technologies (such as biotechnology and nanotechnology). Second, because science, technology and innovation increasingly happen in networked forms of programmes including several actors, boundaries seem to be fading. In the last decade there has been an increasing technological convergence, both at the level of fundamental research and at that of commercialising new products (e.g. biotechnology and micro-electronics have blended into new applications, based on doctoral research). But the difference between fundamental and applied research is also “fading”, which is because of the increasing competitive pressures on speed of delivery and the growing need to involve application environments in the process of technology development (Leijten, 2005).

Networked Innovation and R&D open up opportunities to specifically investigate industry-science relations and technology transfer methods in the DC regions, developing insights at the level of both knowledge generating institutions and recipients.

8 REGIONAL ENTREPRENEURSHIP[25]

Entrepreneurial ventures play an important role in the economy, as they are key players in economic and regional development and account for an important share of newly created jobs (Schreyer, 2000; Storey, 1994). Additionally, they are an important source of innovation and play a critical role in the diffusion of knowledge and the development of emerging industries (Evans and Varaiya, 2003). It has been argued that from the seventies onwards, it has mainly been new firms that have created jobs, while existing large conglomerates have shifted production to low-cost countries (European Commission, 1999). Convinced by the strong association between entrepreneurship and economic growth, the GEM programme was launched in 1999 as a cross-national assessment of entrepreneurship (starting with 10 countries in 1999, growing up to 39 countries in 2005). The GEM programme focuses on three main objectives (GEM Global Report, 2005): (1) To measure differences in the level of entrepreneurial activity between countries (2) To uncover factors leading to appropriate levels of entrepreneurship and (3) To suggest policies that may enhance the level of entrepreneurial activity. GEM is a unique benchmarking instrument that started off as a national comparative framework but countries have been increasingly active in performing similar analyses at regional level.

In this chapter, we first discuss the extent to which the DC regions are involved in entrepreneurial activities, based on regional statistics and regional GEM-studies[26]. Second, we analyse the potentially impeding and facilitating factors driving entrepreneurial activity, such as the availability of entrepreneurial opportunities and fear of failure, Third, informed by the generally acknowledged importance of finance for starting and growing a business, we provide a comparative analysis of the availability of finance for early stage companies in a regional context.

8.1. General entrepreneurship indicators

The entrepreneurial level of a region is hard to capture and only few measures have been developed that provide some insight into the black box. One of those measures is the number of new firms relative to the number of established firms in the region. Table 46 provides an overview of the number of companies that were newly established in 2004, related to the number of already established companies.

[25] / This chapter is the result of contributions made by the following authors: Mirjam Knockaert, Bart Clarysse and Tom Deliveyne.
[26] / Although GEM data were used in the preparation of this chapter, their interpretation and use are the sole responsibility of the authors.

→ Table 46 Newly established firms, 2004

	Number of newly established companies	Total number of established companies	Newly established companies relative to total number (%)
Baden-Württemberg	116,463	426,494	27.3%
Catalonia	24,070	543,719	4.4%
Flanders	27,513	183,985	15.0%
Lombardy	59,128	739,469	8.0%
Maryland	14,495	443,586	3.3%
Nord-Pas-de-Calais	12,007	124,673	9.6%
Quebec	27,830	206,903	13.5%
Rhône-Alpes	32,553	304,042	10.7%
Scotland	10,460	147,695	7.1%

Source: Baden- Württemberg: Statisches Landesamt Baden-Württemberg; Catalonia: Instituto Nacional de Estadistica; Flanders: APS; Lombardy: rapporto Saturno; Maryland: US Census Data; Nord-Pas-de-Calais: INSEE; Quebec: Institut de la statistique Québec; Rhône-Alpes: INSEE; Scotland: Scottish Executive.

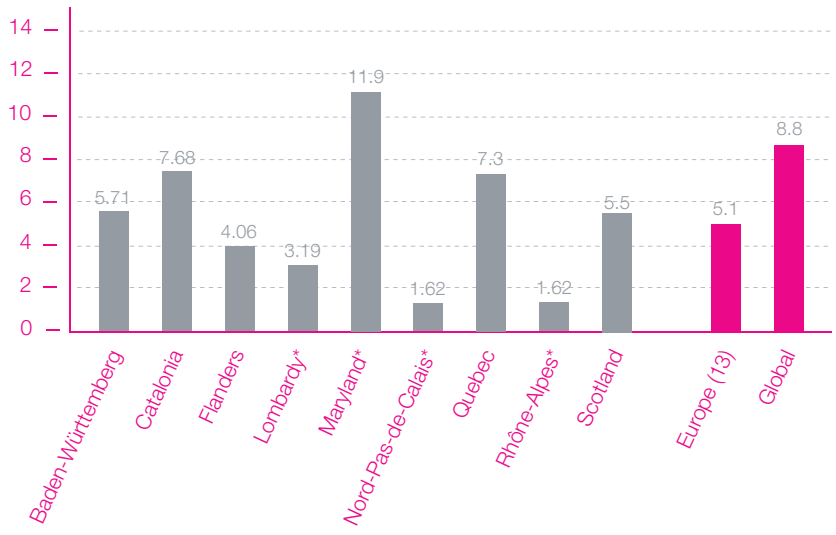
Baden-Württemberg, Lombardy, Rhône-Alpes and Quebec take the lead among the DC regions with respect to the absolute number of newly established companies in 2004. When we relate the number of newly established companies to the total number of companies in these regions, Baden-Württemberg, Flanders, Quebec and Rhône-Alpes have the highest proportion of new establishments, totalling over 10% of the number of established companies. Different explanations can be given, depending on the region. For Flanders for example, there is a strong SME culture, often in the context of family businesses, often related to self-employment goals. For Baden-Württemberg, the ratio might be high because of the high tech cluster that surrounds the region and/or the fact that some large firms are settled in the region, which potentially downsizes the total number of incumbent firms. So, although this information provides some insight into the level of business start-ups, it only provides a static view based on historical statistics.

Every year the Global Entrepreneurship Monitor (GEM) compares the level of entrepreneurial activity internationally, looking at whether these differences are associated with national economic growth and at the national characteristics that are related to differences in entrepreneurial activity. The methodology used combines primary data collection through telephone surveys with citizens and structured questionnaires conducted with expert informants. This primary data is complemented by secondary data from various sources. The GEM consortium now includes about 40 countries worldwide. Some of the GEM country teams study the entrepreneurial activity in regions within their country. This is the case with the following DC regions: Baden-Württemberg, Catalonia, Flanders, Quebec and Scotland. For Lombardy, Maryland and the French regions Nord-Pas-de-Calais and Rhône-Alpes, we take the country data analysis as a starting point, given that the specific data for these regions are too limited to obtain acceptable confidence levels.

Figure 19 provides an insight into the Total Entrepreneurial Activity in the selected regions, as measured by GEM 2003. The Total Entrepreneurial Activity (TEA) is measured as the percentage of individuals in the working age population who are actively trying to start their own business, including self-employment, or running their own business that is less than 3 years old. Therefore, the TEA measure is a less static measure compared to the measures used in the previous figures, and relates the entrepreneurial activity to the population in the specific regions or countries.

Only Maryland has a TEA that is higher than the average global and leads the other regions, coming before Catalonia and Quebec. Catalonia, Baden-Württemberg and Scotland are the regions that exceed the European (13 country) average, with the French regions, Italy and Flanders showing the lowest entrepreneurial activity. The GEM figures prove to be quite different from the statistics gathered on the number of establishments. This may be explained by the fact that GEM measures entrepreneurial activity not only as actual start-ups but also as intentions to start up. For instance, Maryland scores quite high on the TEA measure, but at the same time scores quite low on the number of actual establishments. This may indicate that, even though quite a lot of people are in the process of starting up a new business, they do not really start it up. This may have to do with the fact that there is no real need to start a new business to reach a high living standard. Or it may be that opportunities did not prove to be as good as first perceived, or that fear of failure prevented ultimately people from starting up a business. These factors will be studied in the following sections.

→ Figure 19 Total Entrepreneurial Activity, 2003



*: Country data instead of regional data

Source: Global Entrepreneurship Monitor (2003). Regional TEA for Baden-Württemberg, Catalonia, Flanders, Quebec and Scotland (Baden-Württemberg: German country report; other regions: regional reports).

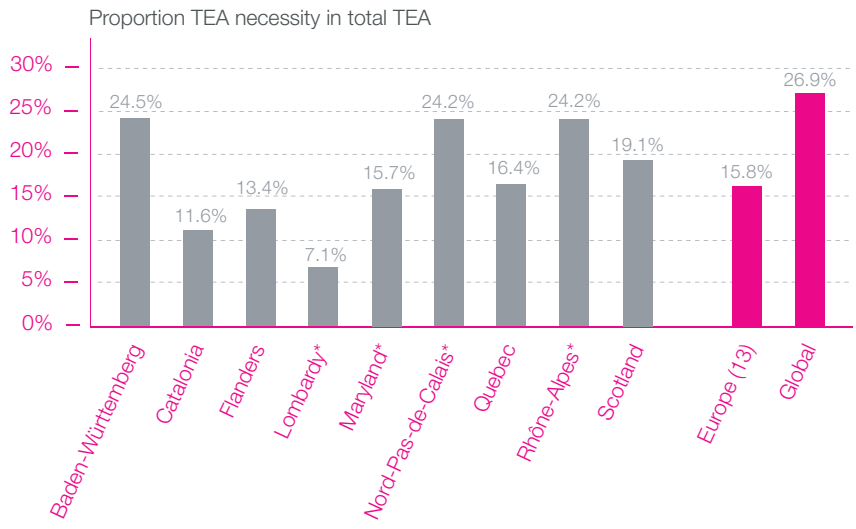
8.2. Facilitators of and impediments to entrepreneurship

Are people driven towards starting their own business because it helps them to obtain a certain standard of living, or are they mainly driven by opportunities they spot? Are people confident about potential entrepreneurship opportunities and the appropriate human capital in their region? To what extent does fear of failure prevent people from starting up a new business activity? The following section addresses these questions in order.

8.2.1. Necessity entrepreneurship

GEM looks at the proportion of people who start up a business for reasons of necessity compared to entrepreneurial activities that are mainly inspired by opportunistic reasons. In the latter case, an entrepreneurial activity was set up because an opportunity for doing so arose. Figure 20 shows that all regions score low on the proportion of TEA out of necessity scale, meaning that most entrepreneurial activity in these regions is inspired by a detection of opportunities. The French regions and Baden-Württemberg have the highest proportion of entrepreneurial activities started up for reasons of necessity, but remain below the global average. This observation is supported by the fact that countries with higher income and growth levels tend to have relatively higher rates of opportunity entrepreneurship (Reynolds et al., 2003). This last is shown in the large difference between the European average and the global average

→ Figure 20 Reasons for starting an entrepreneurial activity: importance of necessity reasons, 2003



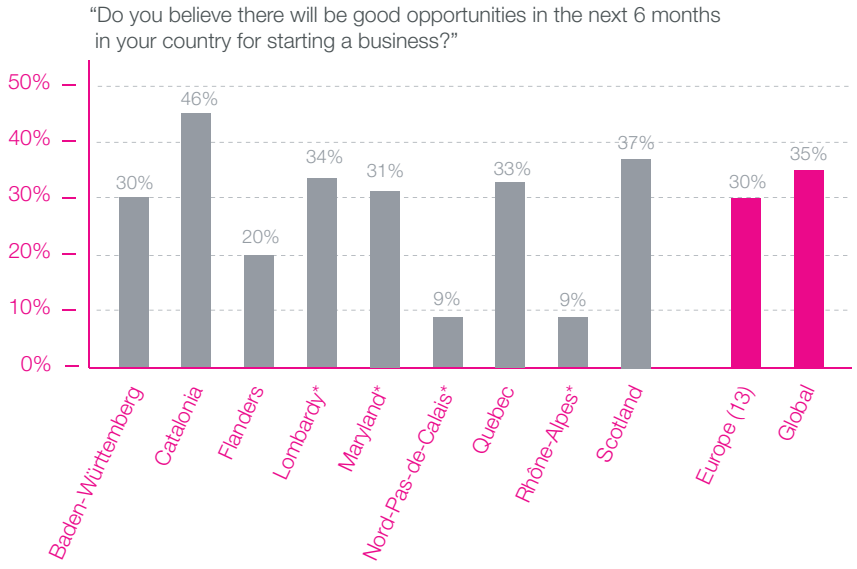
*: Country data instead of regional data

Source: Global Entrepreneurship Monitor (2003). Regional TEA for Baden-Württemberg, Catalonia, Flanders, Quebec and Scotland (Baden-Württemberg: German country report; other regions: regional reports). Country TEA for Lombardy, Maryland, Nord-Pas-de-Calais and Rhône-Alpes (Source: country data set).

8.2.2. Attitudes towards entrepreneurship: opportunities, human capital and fear of failure

GEM also studies the attitudes towards entrepreneurship. It analyses the individual's assessment of opportunities for starting up a business. Additionally, GEM studies whether individuals believe they have the relevant human and social capital to start a business, and looks at whether fear of failure is preventing people from starting one.

→ Figure 21 Opportunity assessment, 2003

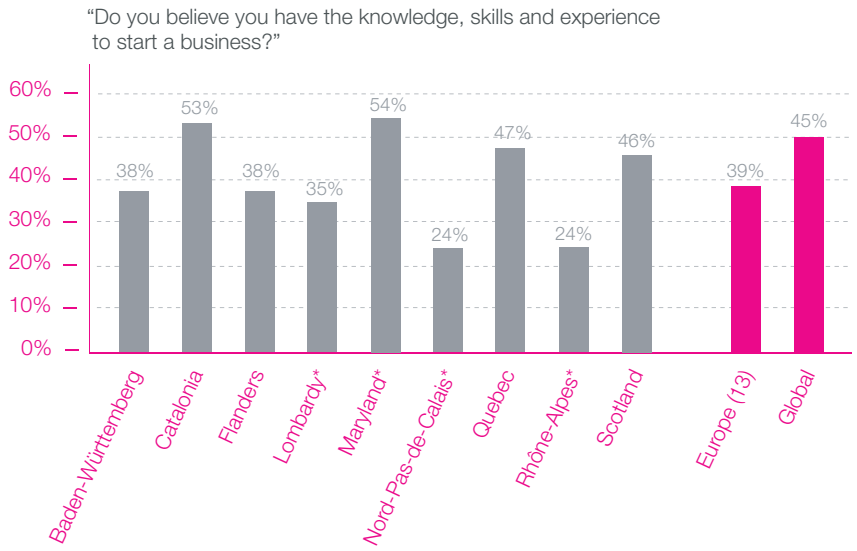


*: Country data instead of regional data

Source: Global Entrepreneurship Monitor (2003).

Entrepreneurship is an activity that involves the discovery, creation and exploitation of opportunities aimed at the introduction of e.g. new goods and services, new ways of organizing, or new processes. People discover opportunities through the recognition of the value of new information that they are exposed to. Figure 21 shows that there are regional differences in the detection of good start-up opportunities. While Baden-Württemberg, Lombardy, Maryland, Quebec and Scotland have proportions of people agreeing that these opportunities exist similar to the global or European mean, some regions deviate (strongly) from these means. The respondents in Catalonia are more confident, with nearly 50% of all respondents agreeing that good start-up opportunities exist. The respondents in Flanders and the French regions are less confident, with hardly 9% of the respondents in France and 20% of the respondents in Flanders believing that good start-up opportunities exist.

→ Figure 22 Human capital assessment, 2003



*: Country data instead of regional data

Source: Global Entrepreneurship Monitor (2003).

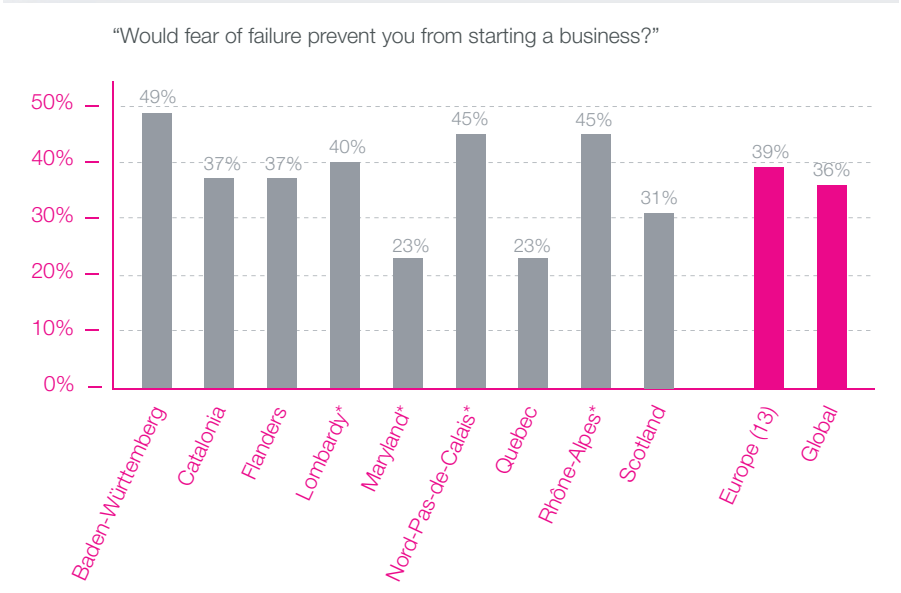
An important aspect of someone's 'human capital' is the confidence one has about having the knowledge, skills and experience to start up a business. Prior research has suggested that individuals might be more inclined to create a venture if they believe they have the capability to be successful in such endeavours.

Respondents in Catalonia, Maryland, Quebec and Scotland are the most confident of having the knowledge, skills and experience to start a business. The least confident are those in France, with only 24% of the respondents believing they possess the necessary skills.

Starting a new venture is an activity that entails a high level of risk. Prior research has suggested that an important driver for bad venture performance is related to the start-up's 'liability of newness' (Oakey, 1995; Storey and Tether, 1998). More specifically, young firms may not be successful in their first years because they need to make high upfront investments, develop internal performance routines, and establish external working relationships. For instance, in their first years of existence start-ups need to build up legitimacy in the market place in order to establish relationships with potential investors, buyers, suppliers, employees and other stakeholders. As a consequence, it should be no surprise that the failure rates of new businesses are far from trivial.

Figure 23 below provides an insight into the extent to which the fear of failure prevents individuals from setting up a company. The stigmatisation of failure has been widely discussed, and the comparison between the EU and the US has been made extensively. Europe lags behind the US because under European bankruptcy rules, the main problem for entrepreneurs is the discharge period - the time during which a bankrupt company is liable for the repayments of debts. In Germany, this period lasts 6 years. The situation in this respect is better in the UK, where the Enterprise Act of 2002 reduced the discharge period for most bankruptcies to a maximum of one year. This is however still more onerous than the US Bankruptcy Code, which allows a fast and complete discharge of debt, with few exceptions and restrictions (Stern, 2004). Also the venture capital industry in the US and EU seems to treat failed entrepreneurs differently. In the US, heading one or even several failed companies does not, in the eyes of venture capitalists, make a manager unfit for the position of CEO. In fact, quite the opposite is true and a failed CEO is likely to be regarded as a person with valuable experience. In Europe, where the venture capitalist (VC) communities are much smaller than the compounded American market, it is important to have a good track record when it comes to raising money. This means a history of funding companies that have been successful long past the IPO. This is mainly caused by the differences in sizes of the VC communities, with the American VC community being a lot larger, and the VC's success being measured by the ability to secure investment return. By contrast, the European VCs place much more value on the record of funded companies that survive and thrive (Frank et al., 1999).

→ Figure 23 Importance of fear of failure when starting up a business, 2003



*: Country data instead of regional data

Source: Global Entrepreneurship Monitor (2003).

In the French regions and Baden-Württemberg fear of failure seems to be to a considerably larger factor in preventing individuals from starting up a business, compared to the European average. The other European regions are in line with the European average, which is far above the US and Quebec data with only 23% of the respondents indicating that fear of failure would prevent them from starting up a business.

In the next part, we will focus on one specific resource that has been found to have a great effect the establishment of new companies and their growth potential: the financial resource.

8.3. A focus on risk financing as a driver for entrepreneurship

In order to start a business and to grow it, people need a set of resources. One set of resources that has been widely discussed in relation to entrepreneurship is the financial resource. Compared to the US, innovative small and medium enterprises in Europe find it more difficult to get started and grow (Gill et al., 2000). The dominant view is that this is due to the nature of capital markets and the problems of raising finance for small risky businesses (Martin et al., 2002). In an early stage of a company's life, there are only a number of financing alternatives. These comprise own money, 3F money ("family, friends and fools"), subsidies, business angel financing, bank financing and venture capital financing. However, there is only limited availability of bank financing in this phase, and mainly on the condition that loans can be based on the entrepreneur's personal collateral, which may be limited. Besides this, in most countries governments provide subsidies, which are mainly used to finance technological research and development. Therefore, the entrepreneur will have to call upon his/her own savings, informal risk financing (such as 3F money or business angel financing) or venture capital financing. In the specific situation of a high tech start-up, research has shown that 3F money, own finance and bank loans are often either insufficient or inappropriate to exploit the rapid growth potential of a new technology fully (Berger and Udell, 1998). In this specific situation, venture capital financing is the most suitable form of external finance (Murray and Marriott, 1998). The lack of finance for early stage companies is often referred to as the "financing gap".

In general, a financing gap refers to a situation where firms, that would merit getting finance, cannot get it due to market imperfections. The well-documented "equity gap" refers to the scarce provision of private equity investment in the early stage of a firm's growth. Quite a lot of research has indicated that, compared to the US, European venture capitalists have a bias against investing in early stage companies (Lockett et al., 2002; Bottazzi and Da Rin, 2002). Early stage investing is more risky than late stage investing, and the returns on early stage investments do not seem to justify this risk. A study carried out by Thomson Venture Economics and EVCA (2004) reports pooled IRRs (Internal Rates of Return) of 1.9% per year for early stage investments compared to 12.2% for MBO funds. The reluctance of investors to invest at an early stage may thus be quite rational.

In what follows, we will study the availability of both informal and formal risk financing for early stage companies in the different regions. Formal risk financing refers to venture capital financing, whereas informal risk financing includes both 3F financing and business angel financing.

8.3.1. Formal risk financing: venture capital

The following table provides an overview of venture capital investments in each region, 2003.

→ Table 47 Amounts of venture capital financing invested in 2003

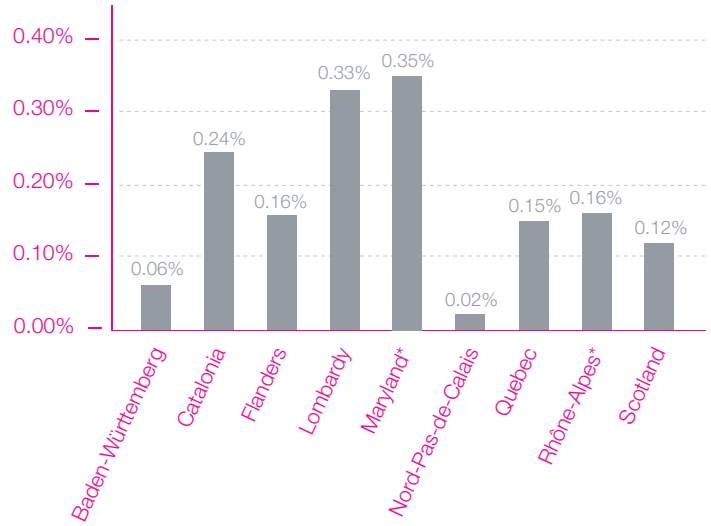
	Venture Capital (million Euro)
Baden-Württemberg	179
Catalonia	328
Flanders	242
Lombardy*	885
Maryland	664
Nord-Pas-de-Calais	17
Quebec	388
Rhône-Alpes	248
Scotland	158

*: data 2002

Source: Baden-Württemberg: BVK; Catalonia: ASCRI; Lombardy: PWC; Maryland: Maryland Innovation and Technology Index 2003; Nord-Pas-de-Calais, Rhône-Alpes, Scotland: EVCA; Flanders: BeBan.

Figure 24 relates the amounts of venture capital invested to the GDP of the selected regions.

→ Figure 24 Venture capital investments as percentage of GDP, 2003

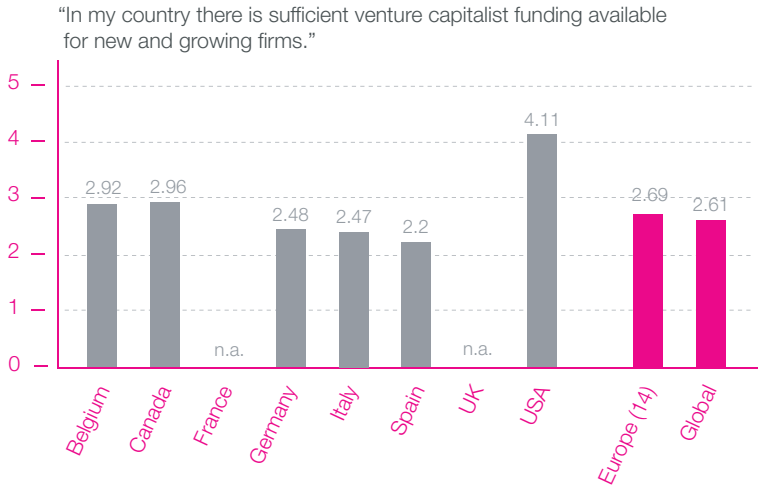


*: data 2002

Source: Baden-Württemberg: BVK; Catalonia: ASCRI; Lombardy: PWC; Maryland: Maryland Innovation and Technology Index 2003; Nord-Pas-de-Calais, Rhône-Alpes, Scotland: EVCA; Flanders: BeBan.

Both absolute and relative numbers provide similar insights: formal venture capital is only available to a limited extent in Nord-Pas-de-Calais and Baden-Württemberg. Maryland and Lombardy have the highest proportion of formal risk financing. The GEM 2005 consortium carried out interviews with experts in each country who were asked to assess the availability of venture capital financing for new and growing firms on a national level. Experts in the US are particularly favourable to the availability of formal financing for early stage companies. Canadian, Belgian and German experts seem to be quite positive on the availability of venture capital funding for early stage companies, even though the amounts invested in these regions are lower compared to other regions such as Catalonia or Lombardy. This may be caused by the different time frames: whereas the historic data on venture capital investments refers to 2003, the expert interviews were carried out in 2005. The Flemish government, for instance, has taken quite a lot of initiatives lately in order to increase the supply of venture capital. At the beginning of 2005, the Arkimedes fund was set up, aimed at leveraging the investment of private VC funds in SMEs. It had raised 110 million Euro from the public in the form of shares or bonds by September 2005. Another initiative that will be operational in 2006, but has already received quite a lot of attention and been widely covered in the media is VINNOF. VINNOF is a government fund that will provide equity financing for seed and early stage businesses.

→ Figure 25 Opinion of country experts on access to VC funding, 2005 (scale: 1= do not agree at all; 5= entirely agree)

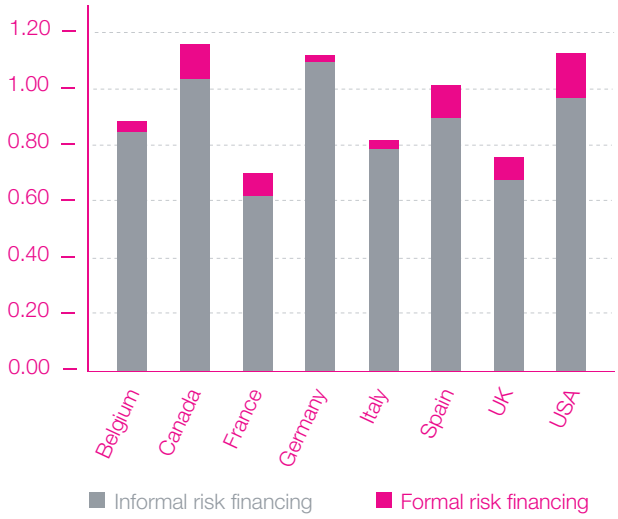


Source: Global Entrepreneurship Monitor, 2005 (expert interviews)

8.3.2. Informal risk financing: 3F money and business angel financing

While studying the equity gap, researchers often focus on the supply of formal venture capital. Informal risk financing, however, is an important financing source for early stage companies, as the following figure shows. The amount of venture capital financing is only a small proportion of the total amount of finance available. For instance, in GEM 2003 it was found that across the GEM countries more than 90% of the funding of entrepreneurial companies was provided by informal investments. In addition, informal investments are provided to a wide spectrum of entrepreneurs ranging from micro- to mega-businesses, whereas classic venture capital is invested only in an elite group of companies with the potential to become 'super stars.'

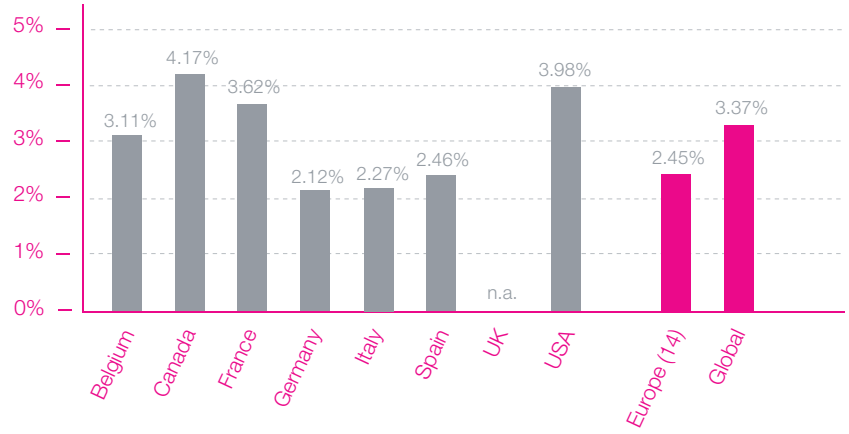
→ Figure 26 The importance of informal investments and classic venture capital in 2003 (% of GDP)



Source: De Clercq et al. (2004)

The following figure provides an insight into the percentage of adults in the different regions who have invested in another person's business over the last 3 years. Even though this data is provided by GEM, there is only limited regional data available for the regions we discuss in this chapter. The regional data we could access however showed little difference from the national data. Therefore, we decided to present the most up to date data on informal financing on a national level. This provides an insight into informal financing in each of the countries. On a European level, on average 2.45% of all adults invested in another person's business over the last 3 years. Only the figures for Germany and Italy are below this European average. All European countries included in this study are however below the global average, except for France. Italy shows the lowest availability of informal financing, Canada and the US have the highest availability of informal financing.

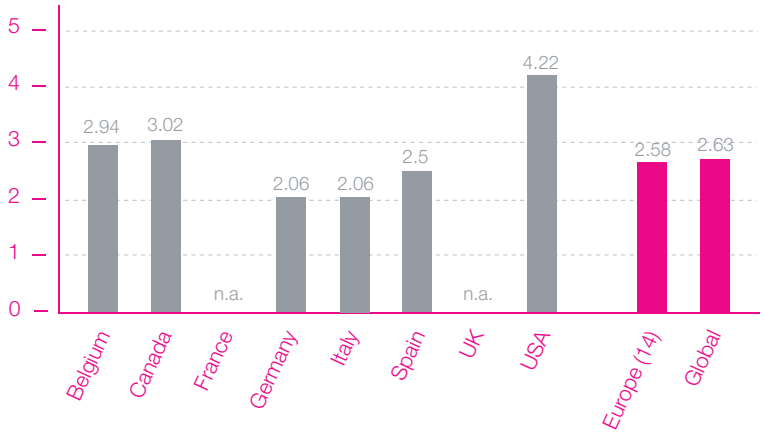
→ Figure 27 Percentage of adults who invested in another person's business over the last 3 years, 2005



Source: Global Entrepreneurship Monitor, 2005

Besides estimating the number of individuals investing yearly in another person's business, GEM interviews experts in each country. The assessments of the experts on the availability of private individuals are in line with the actual estimates of informal investments. Experts in Germany, Spain and Italy are not optimistic about the availability of informal financing in their country, which is reflected in the informal investment rates in Figure 27.

→ Figure 28 Opinion of country experts concerning access to funding from private individuals, 2005 (scale: 1= do not agree at all; 5= entirely agree)



Source: Global Entrepreneurship Monitor, 2005 (expert interviews).

8.4. Conclusion

This chapter highlighted the importance of entrepreneurship in the DC regions. Based on statistics on new establishments (official data), Baden-Württemberg, Flanders and Quebec have the highest proportion of new establishments compared to existing companies. Maryland and Catalonia have the lowest. From the GEM survey in the regions, the US (Maryland), Quebec and Catalonia have the highest level of TEA (Total Entrepreneurial Activity).

This chapter indicates that regions where individuals experience little impediment (such as fear of failure, lack of skills) and good facilitators (existence of opportunities, possession of skills and knowledge, availability of risk financing) are highly involved with entrepreneurial activities. This is for instance the case for Quebec. Regions like Nord-Pas-de-Calais and Rhône-Alpes, where individuals are faced with large impediments and lack facilitators were shown to have relatively low entrepreneurial activity. However, most regions are somewhere in between. What is important to notice, is that entrepreneurship and entrepreneurship impediments and facilitators are in continuous evolution. This is for instance shown by the rapid evolution in Flanders, where the launch of government programmes to increase the supply of financing has dramatically changed perceptions in only a few years.

9 INTERNATIONALISATION

Although innovation and entrepreneurship lie at the basis of economic wealth, the international dimension of both creative processes is very important in regional economic development. This includes first of all the activities and investments of foreign companies within the local economy. Inward FDI can bring in extra financial, technological and managerial resources that can have a substantial positive impact on local economies. The intensified competition between countries and regions to attract foreign investment underlines this importance. Especially in small open economies the contribution of foreign companies to regional development is of crucial importance. Secondly, internationalisation is also about the international expansion of local firms. In an era of globalisation, competition and limited home markets are forcing firms to go international ever sooner. Specific niche products or services even imply an international expansion path from the start. This is very often the case for many high tech, knowledge intensive firms.

This chapter will firstly focus on the degree to which the DC regions are active in international trade. Next the extent to which they are attracting and exporting direct foreign investment will be analysed.

9.1. International trade

International trade – import as well as export – is a first indication of the economic integration of a region into the international community. The degree to which a region is engaged in international trade can be best measured by relating import and export to GDP. One can also calculate an openness index, the average of import and export in proportion to GDP. In general, the smaller the region or country, the higher this ratio.

In comparison with the other DC regions, the export share of GDP peaks in Flanders. Exporting is even larger than GDP. In Maryland, on the other hand, exporting accounts for a relatively small share of GDP (only 2.5%). For the remaining regions export ranges from 20% of GDP in Scotland to 35% in Nord-Pas-de-Calais, whereas import ranges from 14% in Scotland to 41% in Catalonia.

When for each DC region we compare the export and import shares of GDP and the openness index those of its respective nation, we see that most of the regions are more heavily engaged in international trade than their countries. Catalonia, Lombardy and Nord-Pas-de-Calais even have an openness index that is around twice as large as Spain, Italy and France. Only Scotland has an index that is lower than that of its home country (for Maryland only the share of export in GDP, which is a lot lower than that of the USA, is available).

→ Table 48 Regional export and import as % of GDP, 2002

	Export as % GDP	Import as % GDP	Openess index
Baden-Württemberg	33.26%	24.98%	29.12
Catalonia	29.10%	40.52%	34.81
Flanders	118.47%	n.a.	n.a.
Lombardy	29.09%	37.07%	33.08
Maryland	2.49%	n.a.	n.a.
Nord-Pas-de-Calais	35.17%	34.92%	35.05
Quebec	31.75%	23.85%	27.80
Rhône-Alpes	21.19%	17.24%	19.22
Scotland	19.94%	13.73%	16.83

Source: Flanders - APS, other regions: regional statistical bureau

→ Table 49 Export and import as % of GDP, 2002

	Export as % GDP	Import as % GDP	Openess index
Belgium	75.06%	68.90%	71.98
Canada	26.33%	23.18%	24.75
France	18.16%	18.10%	18.13
Germany	28.73%	22.88%	25.80
Italy	16.83%	16.27%	16.55
Spain	13.81%	18.19%	16.00
UK	17.37%	21.17%	19.27
USA	6.65%	11.13%	8.89

Source: OECD

The data shown above relate to all sectors - primary, secondary and tertiary. In chapter 4 we saw that, over the period 1999-2003, 99% of total job creation in all DC regions was in services. Services thus account for a rapidly growing share of an economy's output. To see if their increasing importance is also reflected in the import and export structure, the share of services in total exports and imports is analysed. Unfortunately, no regional comparable data were available for all DC regions, so national data are presented.

→ Table 50 Services in total export and import (%), 2002

	Export	Import
Belgium	17.47%	18.07%
Canada	16.13%	20.30%
France	28.17%	22.45%
Germany	17.19%	30.54%
Italy	23.94%	25.96%
Spain	49.48%	22.54%
UK	45.32%	30.68%
USA	42.43%	20.07%

Source: OECD

Services account for a surprisingly small share of exports in Canada, Germany and Belgium (16 to 17.5% of all exports in 2002). In Italy and France this share is somewhat higher, but still fairly low (24 and 28% respectively). Almost half of American, British and Spanish exports consist of services. As to the services' share of total imports, the discrepancy between countries is smaller than for exports. It ranges from 18% in Belgium to 31% in Germany and the UK.

Besides the share of services in total exports, it is also interesting to look at that of high tech exports (goods as well as services). This can give a first indication of the extent to which a region has come to the fore in the creation and production of knowledge intensive high tech products, which is an important determinant of its capacity to compete internationally in the 21st century. Here too, no regional comparable data were available. As one region can be much more active and specialised in high tech sectors than others within the same country, the national data below do not tell us much about the performance of the DC regions individually and should be interpreted with caution.

→ Table 51 | High tech exports in total exports (%), 2001

	High tech export
Belgium	9.0%
Canada	n.a.
France	25.6%
Germany	15.8%
Italy	8.5%
Spain	6.1%
UK	26.4%
USA	28.6%
EU-15*	19.8%

* : EU-15 figure excludes intra-EU exports

Source: Eurostat (Comext); UN (Comtrade)

In 2001 only 6% of Spanish exports were high tech, only 8.5% of Italian and only 9% of Belgian. In the remaining countries for which data were available the share of high tech exports was much larger, up to almost 29% in the USA.

One of the key aspects of the globalising economy is that knowledge can be diffused much more rapidly than before. Technological knowledge is now transferred internationally by means of licences, patents, disclosure of know-how, franchising, industrial research or technical assistance. A region or country that can export its present knowledge or that can attract and implement foreign knowledge strengthens its competitive position, resulting in increased welfare for its residents. One way to measure international trade in knowledge is to make use of the (national) Technology Balance of Payments (TBP), which reflects the volume of international technology transfers[27].

[27] / The payments included in the TBP are for commercial technologies and are therefore different from R&D expenditure (OECD,2003).

→ Table 52 | Technology Balance of Payments, 1990 vs. 2001

	TBP in % of GDP	
	1990	2001
Belgium	-0.32	0.51
Canada	0.00	0.18
France	-0.05	0.04
Germany	-0.04	-0.36
Italy	-0.05	-0.07
Spain	-0.36	-0.14
UK	-0.07	0.60
USA	0.23	0.22
EU-25	-0.18	-0.06

Source: OECD

In 1990 the USA was the only net exporter of technology. Canada imported just as much technology as it exported, which resulted in a TBP of 0, whereas all European countries shown in the table below ran a deficit.

Most countries (all except the USA and Italy) saw their TBP change significantly over the last decade. While the UK, Belgium, Canada and France had become net exporters of technology by 2001, Germany and Spain still imported more technology than they exported, resulting in a negative balance of payments.

In 2001 the UK and Belgium exported a net 60 and 51% of their GDP respectively, which made them - relative to GDP - larger net exporters of technology than the USA. In 1990 Spain was the largest net importer of technology in relation to GDP; in 2001 it was Germany.

It is important to point out that a deficit does not necessarily indicate low competitiveness. On the one hand, a deficit can result from an increase of imported foreign technologies. On the other, it can also be due to declining receipts. Likewise, a surplus can be the result of a high degree of technological autonomy or a lack of capacity to assimilate foreign technologies[28].

[28] / Another thing that makes an assessment of a country's deficit or surplus on the TBP in a given year in no way straightforward, is the fact that most transactions occur between parent companies and affiliates, which may create distortions in the valuation of the technology transfer (OECD, 2003).

9.2. Foreign Direct Investment

Foreign Direct Investment (FDI) spurs the process of international economic integration, as it creates direct and long-lasting links between economies (OECD, 2005). FDI is defined as an investment involving a lasting interest by a resident entity of one economy in an enterprise in a host economy. More specifically an equity stake of 10% or more is required. As such, the direct investor is presumed to have a significant degree of influence on the management of the direct investment enterprise.

FDI can promote both the development of the local enterprise (and more indirectly the home economy) and the recipient (and host economy), as knowledge and technology are transferred between the two firms. Furthermore, FDI can give the host economy the opportunity to promote its products more widely in international markets and to attract additional funding for capital investment.

With regard to annual FDI flows coming from and going to the DC regions it has once again proven very difficult to find comparable data. That is why we prefer to have a look at national data gathered and checked for comparability by the OECD. However, we realize that one region can be much more successful in sending out and attracting FDI than others within the same country. It is thus important to bear in mind the possibly large regional differences within one single country when analysing the national data shown below.

→ Table 53 | Inward and outward FDI in mn Euro and as % of GDP, 2002

	Inward FDI		Outward FDI	
	mn Euro	% of GDP	mn Euro	% of GDP
Belgium	13,902.00	4.55%	11,637.60	3.81%
Canada	22,352.85	2.19%	28,068.58	2.76%
France	52,014.27	2.92%	52,575.32	2.95%
Germany	38,304.60	1.68%	9,170.24	0.40%
Italy	15,469.33	0.98%	18,210.84	1.15%
Spain	38,189.84	3.94%	33,514.40	3.46%
UK	29,542.41	1.67%	37,417.33	2.12%
USA	76,943.93	0.69%	143,275.67	1.29%

Source: OECD

In general, developed countries are net capital exporters through FDI: FDI outflows greatly exceed FDI inflows. This is clearly the case in the USA, where FDI outflows in 2002 were almost double the inflows. However, in the other countries the difference between in- and outflows is much smaller. In Germany, Belgium and Spain inward FDI flows even exceeded the outward. In Germany inflows were more than four times the outflows.

In million Euros inward as well as outward FDI flows in 2002 were by far largest in the USA. However, in relation to GDP, the American FDI flows are relatively small. When measured as a percentage of GDP, both inward and outward FDI flows are largest in Belgium, followed by Spain. France and Canada complete the top four of largest investors and investment recipients relative to GDP.

The structure of FDI has shifted towards services in recent decades: in the early 1970s services accounted for only a quarter of the world FDI stock, whereas by 2002 this had risen to about 60%. In the same time, the service sectors involved in FDI are also shifting. Besides trade and finance, which before were predominant, utilities, telecommunications and business services are becoming more prominent. This evolution reflects the increasing ascendancy of services within developed economies. Since most services are not tradable[29], i.e. they need to be produced when and where they are consumed, the principal way to bring services to foreign markets is through FDI, which was facilitated by liberalisations in services FDI regimes so that larger inflows were possible (UNCTAD, 2004).

Like FDI in other sectors, FDI in services injects financial resources into a host economy. When raised internationally, these funds add to resource flows into a host country. However, FDI in services can negatively affect the balance of payments of the host economy, as most of the time they entail external payments (e.g. repatriated profits) and, in the case of market-seeking, non-tradable activities, they do not contribute directly to foreign-exchange earnings. Concerns also arise on the possible crowding out of domestic firms, although this depends upon the regulatory framework in place, the market structure and the level of industry development. Apart from these potential costs, FDI in services also has important benefits for the host economy. As with all FDI, FDI in services contributes to the transfer of technology and the generation of employment (although less so per dollar invested than in manufacturing). In addition, FDI can spur local service providers to become more efficient and competitive and improves the supply (in terms of cost, quality, variety,...) of services to intermediate producers and final consumers.

The share of services in total inward as well as outward FDI flows varies greatly between countries. Service FDI inflows account for only 15% of total flows in Canada, whereas in the UK almost all inward FDI involves services. In Germany the share of services in inward FDI was actually over 100%, which indicates that there have been disinvestments in manufacturing making the FDI inflow of services larger than the total FDI inflow. As for outward FDI, services – except in Italy – account for more than half of total flows and even up to 105% in the UK.

[29] / Recently, because of advances made in information and communication technologies, some services have become tradable, i.e. they can produced somewhere and consumed elsewhere. This has opened the door for 'offshoring' of services, which can be done internally by the establishment of foreign affiliates or externally by outsourcing the service and which is mostly triggered by cost considerations. The offshoring of services still is a relatively new phenomenon: even among the 1000 largest firms in the world, 70% still have not offshored any services to low-cost locations (UNCTAD, 2004).

→ Table 54 Share of services in total inward and outward FDI flows, 2002

	Inward FDI	Outward FDI
Belgium	n.a.	n.a.
Canada	14.7%	60.2%
France	71.4%	71.0%
Germany	126.5%	68.6%
Italy*	58.4%	37.4%
Spain*	69.7%	78.5%
UK	96.7%	105.1%
USA	85.0%	68.0%

*: 2001

Source: World Investment Report 2004, UNCTAD

Until now only FDI flows have been discussed. However, data on FDI flows are very sensitive to fiscal and accounting regulations, can change considerably from one year to another and are not always a good indication of the real contribution of multinational firms to the regional economy. The 'transnationality index of host economies' developed by UNCTAD gives a more balanced portrait of the importance of FDI in a country. This index is an average of four different ratios: 1) FDI inflows as a % of gross fixed capital formation for the three years 2000-2002, 2) FDI inward stock as a % of GDP in 2002, 3) value added of foreign affiliates as a % of GDP in 2002 and 4) employment by foreign affiliates as a % of total employment in 2002.

→ Table 55 Transnationality index of host economies, 2002

	Transnationality index
Belgium	77.1%
Canada	20.7%
France	13.5%
Germany	14.3%
Italy	6.1%
Spain	20.5%
UK	16.8%
USA	7.7%

Source: UNCTAD

Within multinationals (MNEs) a recent trend is that R&D specifically is more and more subject to internationalisation. This is not to say that R&D was never previously the subject of FDI, but its internationalisation was mostly limited to adaptating technologies to local markets. Now we see more and more core R&D facilities that go beyond local adaptations being set up in host countries. That this is an important development is proved by the fact that MNEs account for at least half of global R&D expenditure, and at least two-thirds of business R&D expenditure. The phenomenon of internationalisation of R&D has probably not yet reached its peak: an UNCTAD survey of 2004-2005 shows that 69% of the firms questioned stated that the share of foreign R&D was set to increase. Furthermore, China is mentioned most as a destination for future R&D expansion, followed by the USA and India.

Table 56 shows the importance of R&D expenditure by foreign affiliates in the national economies of the DC regions. In absolute value, foreign R&D expenditure is by far the largest in the USA. However, when expressed as a percentage of BERD (business expenditures for R&D), the foreign share of it is relatively small. The opposite is true of Italy, Canada and the UK. In Belgium foreign affiliates even account for more than 70% of all business expenditure on R&D. This underlines the extreme openness of the Belgian economy and the important contribution of foreign affiliates to it. It is clear that in such countries it is very important that the foreign affiliates are well integrated in local networks to maximise the spill over effects of these R&D efforts on the local economy.

→ Table 56 R&D expenditure by foreign affiliates, 2003 (2001 for Belgium, Germany and Italy; 2002 for France and United States)

	mn Euro	% of BERD
Belgium	n.a.	71
Canada	2,720	34.8
France	3,532	19.4
Germany	6,353	22.1
Italy	1,740	33
Spain	1,215	27.3
UK	8,903	45
USA	24,372	14.1

Source: World Investment Report 2005, UNCTAD, OECD

SHANGHAI: THRIVING INTERNATIONAL TRADE AND FOREIGN DIRECT INVESTMENT

Shanghai has known an impressive economic boom during the last decade. Although it only accounts for 1% of China's population and 0.06% of its land area, it has made a great contribution to China's social and economic development. Since 1992, the city has maintained a double-digit GDP growth rate for 13 consecutive years. In 2004, its GDP reached 745,027 billion yuan, which represented a growth in real terms of 13.6% compared to the previous year and the highest growth rate since 1996. During the period 1990-2004 Shanghai's economy has grown with 12% annually.

This track of constant fast growth has been the result of an extensive number of policies by both China's and Shanghai's municipal government. The process of advancement in education has been sped up, as well as the promotion of science and technology. Next, Shanghai has opened its doors to the international market, as it expressed the ambition to become an international economic, financial, trade and transportation centre. This went hand in hand with the development of an extensive infrastructure (transport, industrial zones and business districts, etc.).

Thanks to the active efforts in developing an export-oriented economy, the city has witnessed fast expansion in foreign trade. In 2004, Shanghai's foreign trade volume totalled 160,026 billion US dollars, of which 86,506 billion US dollars import and 73,520 billion US dollars export. Total foreign trade increased by 42.4% compared to the previous year, while import and export grew with 35.3% and 51.6% respectively.

This growth of international trade has been spurred by an improved export strategy. First, Shanghai recently upgraded its export products to involve more high and new technology. In 2004, the city's export of new and high-tech products grew with 76.4% in comparison with 2003 up to 28,868 billion US dollars and accounted for 39.3% of the city's total exports, up from 33.7% in 2003. Second, Shanghai has tried to further diversify its export markets. In 2004, not only the exports to other Asian countries have witnessed a very high growth rate (+49.3%), but the same applies to the European (+58.3%), North-American (+51.5%), Latin-American (+45.3%) and Oceanian market (+59%). Third, Shanghai has streamlined its customs procedures and reduced the time for customs clearance considerably (e.g. through its 'Great Clearance' Programme that started in 2000), what positively impacted the trade through Shanghai Port. Export and import through Shanghai Customs increased by 40.4% in 2004. The commodities passing through the city's port now account for 25% of China's total.

Next to the rapid expansion of foreign trade, Shanghai has also been increasingly attracting foreign direct investment. The table below depicts the total number of foreign direct investment projects and the value of contract of these foreign investments from the 1980's onward up to the year 2002, as well as their percentage in accumulative FDI over the same period. The third column shows the number of joint ventures, their value of contract and their share in total foreign direct investment.

→ Table | Shanghai's FDI volume from the 1980's up to 2002 (in 10,000 US $)

	Percentage of total FDI's		Total		Joint venture		
Year	Number of projects	Value of contract foreign-investment	Number of projects	Value of contract foreign-investment (B)	Number of projects	Value of contract foreign-investment (A)	Share of (A) in (B)
before 1978	0	0	1	1000	1	1000	100%
1973-1983	0.1	0.1	17	5996	10	4562	76%
1984	0.1	0.3	41	19548	24	10613	54%
1985	0.3	0.5	94	30529	62	7417	24%
1986	0.2	0.1	62	9474	45	4516	48%
1987	0.3	0.2	76	12914	60	10972	85%
1988	0.8	0.3	219	16625	204	12626	76%
1989	0.7	0.3	199	17737	175	11174	63%
1990	0.7	0.3	203	21374	161	10987	51%
1991	1.3	0.4	365	27853	292	24133	87%
1992	7.3	2.9	2012	185997	1592	111276	60%
1993	13.2	5.9	3650	375683	2445	231385	62%
1994	13.7	8.4	3802	534669	2066	284726	53%
1995	10.3	8.5	2845	536026	1372	237107	44%
1996	7.6	9.2	2106	580783	808	197734	34%
1997	6.5	8.4	1802	531999	565	274229	52%
1998	5.4	9.2	1490	584776	378	252906	43%
1999	5.3	6.5	1472	410375	399	151056	37%
2000	6.5	10.1	1814	638972	441	138558	22%
2001	8.9	11.6	2458	737345	506	188879	26%
2002	10.9	16.7	3012	1057645	530	196044	19%
Total	100	100	27740	6337320	12136	2361900	37%

Source: Shanghai Foreign Economic Relations and Trade Commission, www.smert.gov.cn/english/tjsj/invt_old.asp

The number of FDI projects in Shanghai increased significantly as from the beginning of the '90s to reach its first top in 1994 (3,802), after which it slowed down slightly and started to increase again from 2000 onwards, up to 3,012 in 2002. However, the contract value of these FDI projects has been augmenting steadily during the whole period to reach more than 10.5 billion US $ in 2002. The number of joint ventures was at its height during the first half of the '90s (up to 2,445 projects in 1993), after which it declined rather rapidly to 530 joint ventures in 2002. Over the whole period, the share of joint ventures in total foreign investment projects shrank significantly. In 2002 they only represented 19% of total FDI.

Shanghai's municipal government recently announced that the city approved of 4,334 FDI projects in 2004, which represent a total contract value of 11.691 billion US dollars, of which 6.541 billion US dollars had already been invested. By the end of 2004, the city had accumulatively signed 36,300 FDI projects from 116 countries and regions around the world for a total contract value of 86.129 billion US dollars, of which 52.806 billion US dollars had already been invested. As such, the increasing trend that is shown in the table above has not yet been mitigated, on the contrary.

Today, Shanghai is definitely on its way to become an international financial and transportation hub. The city already is the financial centre of China, and by the end of 2004, 113 operating overseas-funded financial institutions were located in Shanghai. Next to financing, Shanghai is also gaining expertise in export processing and bonded storage. Waigaoqiao Free Trade Zone is one of the largest bonded areas in China. In 2004, the operational revenue of the storage firms based in the free trade zone increased by 26.4% compared to the year before. The storage entrepot trade jumped by 130%.

Shanghai is the first city in China to establish an investment promotion organization – Shanghai Foreign Investment Development Board – to provide foreign investors with comprehensive services. Furthermore, Shanghai's government has improved its transparency and efficiency towards foreign investors, for example by designing a gateway website (www.shanghai.gov.cn) were investors can make enquiries, file consultations and lodge complaints and by reducing waiting times for approval of foreign investment projects from five to three weeks.

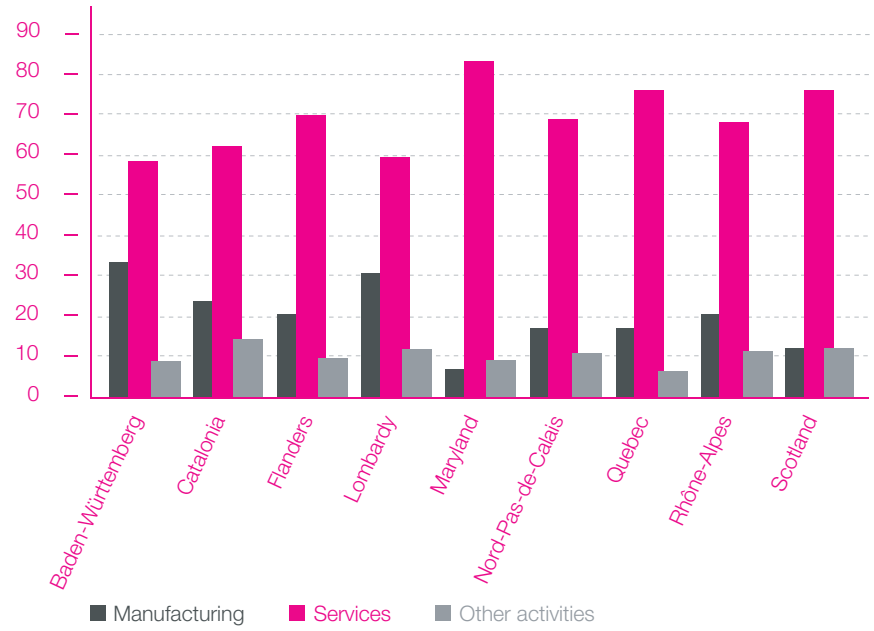
Source: Shanghai Foreign Economic Relations and Trade, http://www.smert.gov.cn;
Shanghai Municipality, http://www.shanghai.gov.cn

A key element in characterising regional economies is the mixture of economic activities. Three major groups of economic activities are identified: manufacturing, services and other activities such as agriculture, mining and construction. In the previous chapters, the evolution towards a knowledge economy in the DC regions was discussed. The data in this chapter illustrate the changing economic structure that is taking place within the DC network towards a knowledge based economy.

10.1. Services industries

Although all regions have a high share of services, there are still big differences in the share of manufacturing. Figure 29 depicts this economic structure by the nature of economic activity. This economic structure is measured by looking at the employment figures. Employment gives a better indication of the economic and social impact of the sector structure than GDP.

→ Figure 29 Economic structure by nature of economic activity – employment in share of total (%), 2004



Sources: Eurostat, US Department of Labor – Bureau of Labor Statistics, Institut de la Statistique du Québec

→ Table 57 Number of service jobs per job in manufacturing and per job in manufacturing and other activities, 2004

	Services/Manufacturing & other activities
Baden-Württemberg	1.4
Catalonia	1.6
Flanders	2.3
Lombardy	1.5
Maryland	5.2
Nord-Pas-de-Calais	2.2
Quebec	3.2
Rhône-Alpes	2.1
Scotland	3.2

Sources: Eurostat, US Department of Labor – Bureau of Labor Statistics, Institut de la Statistique du Québec

All regions are characterised by a high degree of services, although Maryland (83.7%) is much more service intensive than Baden-Württemberg (58.1%) and Lombardy (59.8%). In the latter two regions, manufacturing still covers one third of total employment. Consequently, Baden-Württemberg and Lombardy have the lowest ratio of services to manufacturing and other activities (1.4 and 1.5 respectively). Scotland and Maryland, on the other hand, are typical service economies since there are 5.2 and 6.5 times more people employed in the service sector than in manufacturing and other activities. These regions have the lowest shares of manufacturing employment (7.1% in Maryland and 11.8% in Scotland). In these two regions, other activities are also more important than manufacturing. While these other activities still represent 14.2% of employment in Catalonia, their share of Quebec's employment is only 6.8%.

10.2. High tech and knowledge intensive industries

An alternative way of looking at the economic tissue of regions is by focussing on the technological complexity of the economic activity. In this case the various activities within the manufacturing and service sectors can be classified by technical complexity, based on the classifications defined by the OECD and Eurostat[30].

10.2.1. Manufacturing

In the seven European regions, low tech manufacturing still is more important than high tech from an employment point of view. However, between 1995 and 2004 the number of jobs in high tech has

[30] / See Appendix A for a classification of manufacturing and services based on technology intensity.

increased, while employment in low tech industries has dropped. High tech manufacturing includes high and medium high tech manufacturing, low tech includes low and medium low tech manufacturing, as defined by the OECD.

→ Table 58 Techno-economic structure: Employment by technology complexity and knowledge intensiveness – sub-groups in row percentages of total, 2004

1995	Total manufacturing	High tech	Low tech	% HT
Baden-Württemberg	1,654,819	834,224	820,595	50.4%
Catalonia	598,297	202,204	396,092	33.8%
Flanders	544,840	220,820	324,020	40.5%
Lombardy	1,215,993	405,768	810,224	33.4%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	256,086	75,088	180,998	29.3%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	526,361	196,925	329,436	37.4%
Scotland	368,101	145,520	222,580	39.5%
Total	5,164,497	2,080,549	3,083,945	40.3%

2004	Total manufacturing	High tech	Low tech	% HT
Baden-Württemberg	1,629,454	937,598	691,856	57.5%
Catalonia	732,692	255,065	477,627	34.8%
Flanders	526,076	198,889	327,187	37.8%
Lombardy	1,246,543	443,604	802,393	35.6%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	301,403	75,000	226,403	24.9%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	486,930	212,304	274,626	43.6%
Scotland	281,898	108,235	173,663	38.4%
Total	5,204,996	2,230,695	2,974,301	42.9%

Source: Eurostat

Strikingly, pure high[31] tech (e.g. pharmaceuticals) is not as common as one might expect. However, this does not deny its importance in terms of regional 'image building' and marketing to attract foreign investors in the age of globalisation (see earlier). Nor does it diminish the possible spill-over effects from innovative activities in high tech sectors. Between the regions substantial differences in the share of high tech in total manufacturing exist. While Baden-Württemberg clearly has a technology driven industry (57.5% of manufacturing jobs are in high tech companies), Nord-Pas-de-Calais is still focussing on low tech (only 24.9% of manufacturing employment is in high tech). Together with Flanders, Nord-Pas-de-Calais is the only region where the share of high tech in total manufacturing dropped between 1995 and 2004. It comes as no surprise that Baden-Württemberg is the leading region for high tech employment, in both absolute and relative terms. The region already had the highest share of high tech manufacturing in 1995 (50.4%) and has actually increased its high tech employment since then. Even in 2004, no other region even comes close to Baden-Württemberg's 1995 share of high tech manufacturing employment. In 2004, Baden-Württemberg represented 42% of all high tech jobs in the seven regions.

→ Table 59 | Evolution of employment in manufacturing and sub-sectors vs. total employment (%), 1995-2004

Δ 1995-2004	Δ Total manufacturing	Δ High tech	Δ Low tech	Δ All employment
Baden-Württemberg	-1.5%	12.4%	-15.7%	4.0%
Catalonia	22.5%	26.1%	20.6%	43.2%
Flanders	-3.4%	-9,9%	1.0%	9.3%
Lombardy	2.5%	9.3%	-0.9%	13.7%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	17.7%	-0.1%	25.1%	24.7%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	-7.5%	7.8%	-16.6%	4.9%
Scotland	-23.4%	-25.6%	-22.0%	4.9%
Total	0.8%	7.2%	-3.6%	12.7%

Source: Eurostat

In most regions, employment in manufacturing has dropped since 1995. In Nord-Pas-de-Calais (+17.7%) and Catalonia (+22.5%) on the other hand, employment in manufacturing has increased substantially. In Nord-Pas-de-Calais, this is all thanks to low tech manufacturing, whereas in Catalonia both high and low tech contributed to the employment growth in manufacturing. These are also the two regions with the highest growth in overall employment (+24.7% and +43.2% respectively). For the seven European regions, employment in manufacturing has increased by only 0.8% in 10 years, while overall employment growth was 12.7%. The number of jobs in low tech manufacturing in these

[31] / The share of "pure" high tech in total high tech (i.e. including medium high tech) ranges from 11.5% in Catalonia to 30.1% in Scotland.

regions has dropped by 3.6%, whereas high tech manufacturing increased by 7.2%. In Baden-Württemberg, the 12.4% increase in high tech employment, could not compensate for the 15.7% loss of low tech jobs. Scotland has not only lost 22.0% of its low tech manufacturing jobs, but perhaps more importantly also 25.6% of its high tech manufacturing jobs. In Flanders too, the number of jobs in high tech manufacturing has decreased considerably (-9.9%) over the last ten years, although not as dramatically as in Scotland.

While employment in high tech manufacturing has increased to some extent, low tech employment has dropped. Over the last ten years, total manufacturing employment has remained the same over the seven regions, although there are substantial differences between them. Total employment has grown in all regions, but growth in manufacturing employment was non-existent or negative in some. In these regions, but also in the others, the services sector was responsible for most job creation. Especially in knowledge intensive services, employment has increased dramatically.

10.2.2. Services

Service jobs have been gaining importance over the past 10 years. While total employment has increased by 12.7%, the number of jobs in services has grown by 20.1% over the same period (see Table 61). This employment growth in services is driven by knowledge intensive services. These KIS have grown by 31.7%, while other services have grown slower than the trend in overall employment (9.9% vs. 12.7%). In all regions, employment in both KIS and LKIS has increased between 1995 and 2004.

→ Table 60 Employment in services and sub-sectors and share of knowledge intensive services in total services, 1995 and 2004

1995	Total services	Knowledge intensive services	Less knowledge intensive services	% KIS
Baden-Württemberg	2,564,692	1,243,695	1,320,007	48.5%
Catalonia	1,288,463	490,043	798,420	38.0%
Flanders	1,535,808	729,965	805,843	47.5%
Lombardy	1,995,200	883,005	1,112,195	44.3%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	832,804	388,934	434,870	46.7%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	1,438,916	730,807	708,109	50.8%
Scotland	1,615,019	835,624	779,395	51.7%
Total	11,270,902	5,302,073	5,959,829	47.0%

2004	Total services	Knowledge intensive services	Less knowledge intensive services	% KIS
Baden-Württemberg	2,862,708	1,518,741	1,343,967	53.1%
Catalonia	1,931,745	858,990	1,072,755	44.5%
Flanders	1,758,861	951,952	833,909	53.3%
Lombardy	2,477,762	1,308,593	1,169,170	52.8%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	1,055,375	526,548	528,827	49.9%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	1,600,892	833,846	767,046	52.1%
Scotland	1,822,015	985,463	836,552	54.1%
Total	13,536,358	6,984,133	6,552,226	51.6%

Source: Eurostat

In 1995 only two regions (Scotland and Rhône-Alpes) had more employment in knowledge intensive services (KIS) than in less knowledge intensive services (LKIS). Since 1995, all regions have shown a clear evolution towards a knowledge driven economy. In 2004, Catalonia was the only region where LKIS was still more important than KIS. However, the number of KIS jobs in Catalonia increased from 490,043 to 858,990 (+75%). Total employment in KIS in the seven regions increased from 5.3 million in 1995 to almost 7 million in 2004. The difference between the share of KIS and other services in total services employment, is less pronounced than that between the shares of high and low tech manufac-

turing. In most regions KIS represent about 50% of all service jobs. While Rhône-Alpes had the second largest share of KIS jobs in 1995 (50.8%), it only had the fifth largest share in 2004 (52.1%), whereas Scotland still is the leading region in knowledge intensive services.

→ Table 61 | Evolution of employment in services and sub-sectors vs. total employment (%), 1995-2004

Δ 1995-2004	Δ Total services	Δ Knowledge intensive services	Δ Less knowledge intensive services	Δ all employment
Baden-Württemberg	11.6%	22.1%	1.7%	4.0%
Catalonia	49.9%	75.3%	34.4%	43.2%
Flanders	16.3%	30.4%	3.5%	9.3%
Lombardy	24.2%	48.2%	5.1%	13.7%
Maryland	n.a.	n.a.	n.a.	n.a.
Nord-Pas-de-Calais	26.7%	35.4	21.6%	24.7%
Quebec	n.a.	n.a.	n.a.	n.a.
Rhône-Alpes	11.3%	14.1%	8.3%	4.9%
Scotland	12.8%	17.9%	7.3%	4.9%
Total	20.1%	31.7%	9.9%	12.7%

Source: Eurostat

The fastest growers in LKIS are Nord-Pas-de-Calais (21.6%) and Catalonia (34.4%). Catalonia also has the biggest increase in KIS (75.3%). Not surprisingly, this region also has the biggest overall employment growth (43.2%). The number of KIS jobs in Lombardy has also increased substantially (+48.2%). However, as in most other regions, LKIS employment has grown much slower in Lombardy (+5.1%). Scotland and Rhône-Alpes are the only regions where LKIS employment growth outpaced total employment growth. Knowledge intensive services, on the other hand, have grown faster than total employment in all regions. Thanks to this growth in KIS, total employment in services also increased faster than overall employment in all seven regions.

10.2.3. Conclusion

While the European regions are transforming themselves into knowledge driven economies, employment in manufacturing is losing importance. Employment in low tech manufacturing in particular has declined over the past 10 years. High tech manufacturing on the other hand is still gaining importance on average, although large differences exist among the regions. While there was a drop (-3.6%) in low tech employment, high tech employment still grew by 7.2%, but this growth is slower than total employment growth (12.7%). This 12.7% increase in overall employment can be explained by the services sector. The services sector grew by 20.1% and now represents 13.5 million jobs in these seven regions, compared to 5.2 million in manufacturing. This high growth is not a general trend in the services sector. On average, especially knowledge intensive service jobs have grown three times as fast as other service jobs and now represent more than half of employment in services in the DC network.

10.3. Creative industries

Creativity and creative industries are crucial for a nation's competitive position. But there is no consensus on the definition of creative industries. Nevertheless, researchers try to measure the size of these creative industries. In the literature, some authors (e.g. Rutten, 2004) have tried to identify specific sectors, while others (e.g. Florida, 2002) have focussed on occupations. The sector approach looks at industries such as design, advertising, architecture and arts, where creativity is obvious. A possible shortcoming in this approach is that all employees in these sectors are included, regardless of their actual job. Most organisations, even in these sectors, are not staffed only with creative employees in creative jobs, but also have supporting staff. Looking at occupations evidently makes up for this limitation. However, using a broad classification of creative occupations may overestimate the number of creatives. While it is perfectly possible that some lawyers and sales managers are creative in their profession, others may not be creative at all. This is not the case only in creative sectors, but in all sectors.

Classifying sectors and occupations as creative and others as less creative is a difficult task, and no single clear-cut definition exists. It should also be noted that people with occupations or in industries that are listed as non-creative, can be creative as well, however for most of them creativity is not an essential part of their job. Nevertheless, creative jobs and creative individuals can be found in almost every organisation.

Moreover, there is no clear line between cultural, creative and knowledge intensive jobs and activities as there may be some overlap between them. Efforts in different regions to map the creative industries demonstrate the lack of a single definition. This makes it impossible to compare the size of the creative industries in different regions. Therefore we have chosen to present some of these regional initiatives, without comparing them. In general, the regional data show that creative industries are booming. The number of businesses and people employed in creative activities is growing faster than the overall economy.

Flanders

The creative sector in Flanders has been analysed in a previous study by Flanders DC, covering creativity in 13 Flemish cities and Brussels (De Voldere et al., 2005). To determine the size of the creative industries in Flanders, the definition of Rutten et al. (2004) was used. Creative industries are classified in three major sub-groups: arts, media & entertainment, creative business services. Creative industries are a growth sector in Flanders. The number of persons employed in creative industries in Flanders increased from 26,255 in 1995 to 33,382 in 2002 (+27%). Between 1995 and 2002, employment grew three times faster than total employment (27.1% vs. 8.6%).Over the same period, the number of businesses[32] active in these industries grew from 2,994 to 3,682 (+23%), while the total number of companies dropped by 1.6%. In 2002, these businesses represented 2.0% of all companies and 1.4% of all jobs in Flanders.

[32] / Only those businesses employing at least one person are considered.

Maryland

According to a study by Americans for the Arts[33], the United States had 578,487 arts-centric businesses, employing almost three million people in 2005 i.e. 2.2% of total employment. This group of 3 million people comprises only those employed in creative industries that are arts-centric, ranging from performing arts to architecture and advertising. This of course results in a very conservative estimate. Industries like computer programming and scientific research are excluded as they do require creativity, but are not arts-centric. These businesses represent 4.4 percent of all businesses and 2.2% of all jobs in the United States. The number of businesses has grown 5.5% from 2004 to 2005, while total US business growth was only 3.8 percent. Although the number of businesses has increased, employment in these businesses has dropped by 0.8% (from 2.99 million in 2004 to 2.96 million in 2005). Despite this drop, creative businesses still performed better than the total job market. Employment in the US dropped from 137 million in 2004 to 135 million in 2005 (-1.9%).

Maryland is showing a similar trend. The number of creative businesses has increased by 7.4 percent, bringing the total to 10,742. However, the number of jobs has dropped from 47,907 in 2004 to 46,536 in 2005 (-2.9%). In 2004, the creative industries represented 6.4% of all businesses and 1.9% of all employment.

Richard Florida[34] has also made an estimate of the 'creative class' based on their occupations. Florida has a very broad definition of creative workers. He defines it as employees who are paid to think. The creative class according to this definition is roughly 10 times as big as employment in the creative industries as defined by Americans for the Arts. Florida (2005) estimates the number of people with creative occupations at 39 million in the United States or 30% of the workforce.

Quebec

Research by Florida, Stolarick and Musante[35] (2005) shows that Quebec has a large "creative class". Using Florida's broad definition, they found that Quebec's creative class is concentrated in Montreal, where 450,200 persons or 28.8% of the workforce have creative occupations. They expect the creative sector to grow by at least 21% over the next ten years, while the service sector will grow by 34% and the 'working' sector by only 14%. For the whole of Quebec, the creative class contains over one million people (1,008,198 in 2005), making up 27.7% of all workers. This creative 27.7% of the workforce in Quebec earns 41.2% of all wages, while the 28.8% in Montreal earn 40.6%.

Scotland

A report by the Scottish Executive[36] demonstrates that creative industries have gained a lot in importance in recent years. Between 1998 and 2002, turnover of creative businesses almost doubled (from 2.6 to 5.1 billion GBP). The number of businesses active in creative industries has increased from 6,784 in 1998 to 7,444 in 2002 (+9.7%), which means they have grown 50% faster than the total number of companies (+6.3% over the same period). Despite a slight decline in 2002, the number of jobs in Scotland's creative industries has grown from 39,800 in 1998 to 51,800 in 2002 (+30.2%), while total employment increased only 5.4% over the same period. The creative industries represent 5.1% of all businesses and 2.0% of employment in Scotland. The computer services and software industry constitutes the largest group of creative professionals, representing almost a third of all creative employment. Architecture and radio and TV are also important, with 13.7% of jobs each.

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[33] / Source: Americans for the Arts, Creative Industries Study, June 28, 2004

[34] / Florida (2002), The Rise of the Creative Class.

[35] / Florida, Stolarick and Musante, Montreal's Capacity for Creative Connectivity, 2005.

[36] / Source: Scottish Annual Business Statistics 2002. Creative industries are: Advertising; architecture; video, film & photography; music and visual and performing arts; publishing; software & computer services; radio & TV; art/antiques trade; designer fashion.

SHANGHAI: CULTURAL SECTORS

Shanghai's municipal government, recognizing the growth potential of the creative sector, has recently decided to invest more in these industries to reduce reliance on the manufacturing sector. City officials declared that Shanghai's creative industry development anchors in five domains: creative research and design, creative architectural design, creative media and culture, creative consulting and planning and creative leisure consumption. Shanghai has some very ambitious plans to become one of the most influential centres of creative industries in Asia. After investing 4 billion yuan (479 million euro) in 2004, another 2 billion yuan will be invested in the years to come to boost companies involved in creative activities like architecture, culture and design.

In 2004, Shanghai's creative industries created 49.3 billion yuan (4.7 billion euros) in value added, i.e. 6.6% of the GDP[38]. A booming sub-sector which definitely will be nurtured in the future is the creative design industry, already employing more than 10,000 people in 800 companies from more than 30 countries including the US, Japan, Belgium, France and Italy. According to Xu Jianguo, director of the Shanghai Economic Commission, the city aims to raise the share of all creative industries in total value added to 10% by 2010.

In April 2005 a first group of 18 licensed creative industry areas was opened, which by now houses more than 800 companies from all over the world active in among other design, games and software design, media and fashion. The Shanghai Economic Commission already granted another group of 18 creative industry focal points, covering more than 30 hectares and mostly situated in Shanghai's old industrial complexes. As Shanghai is at the origin of China's industrial base, it possesses a large quantity of old factories and warehouses that can now be transformed. The city will strive to create between 70 and 80 creative industrial centres by 2007, which can gather three to four thousand creative companies of all types.

Shanghai's movement to promote creative industries has caught the eye of the international community. In 2005 it held the 'Shanghai International Creative industry Week', from 30 November till 6 December 2005. It was the first time that a large international event dedicated to the creative industry took place in Shanghai, and on mainland China. Its aim was to push the further development of Shanghai's creative industry, to enhance communication and international cooperation, to share experiences and showcase achievements. Supported by the Shanghai local government this event brought together both domestic and international representatives of creative organizations and companies, academic experts and researchers, government officials, designers, etc.

Also, in December 2005 UNCTAD and the UNDP Special Unit for South-South Cooperation, in partnership with the Shanghai Creative Industry Association and the School of Creative Studies, organised a 'UN Global South-South Symposium on the Creative Economy'. The objective of the two-day seminar was "to promote dialogue on ways to capitalize on the creative economy in developing nations as a tool for development". Research effectuated by UNCTAD reveals that despite of the abundance of talent and creativity, most developing countries do not benefit from the dynamism typical of the creative sector in terms of development. UNCTAD is convinced that "with effective nurturing, creative industries can open up new opportunities for developing countries to increase their share of world trade and to leapfrog into new areas of wealth creation."

[38] / UNCTAD has estimated creative industries to account for 7% of global GDP nowadays, which by 2015 is expected to reach 11%.

Source: UN Press Release OHRLLS/68/2005, Greater emphasis on creative industries could unlock wealth for poor countries – UN envoy; UNCTAD Press Release 15 December 2005, UNCTAD, UNDP establish new partnership to aid creative economy in developing countries; China Daily 5 December 2005, Creative industries to be developed; China News 1 December 2005, Shanghai to become centre for creative industries; Xinhua Online 24 November 2005, Shanghai to invest in creative industries; China View 14 December 2005, Shanghai to host UN creative industry seminar; Shanghai International Creative Industry Week, http://portal.unesco.org/

10.3.1. Conclusion

While creative businesses are relatively small (e.g. Maryland: 6.4% of businesses represent just 1.9% of employment), job creation in them has grown more rapidly. It is expected that this trend will continue.

According to the Shanghai authorities, the creative economy was estimated at 2.9 trillion USD in 2004 and is expected to be worth 4.1 trillion USD in 2010 worldwide. Florida (2002) quotes John Howkins, who estimated the core industries of the creative economy to be worth 2,240 billion USD in 1999. The US takes 42.8% of this market.

10.4. Conclusion

This chapter has shown that the DC regions in this study have made a remarkable shift in their economic structure towards knowledge intensive industries (both in services and manufacturing). Moreover, in several regions studies have shown that the core creative industries are growing at a steady rate. By reorienting their resources towards those industries that are still expected to grow significantly in the future, the DC regions not only guarantee their welfare today, but are also creating every chance of generating this welfare in the future.
A creative economy should focus its activities on knowledge intensive sectors, as these mostly act as a spur to economic growth. The importance of these activities has been the subject of many reports lately. The OECD (1996) stated that “knowledge intensive and high technology parts of OECD economies tend to be the most dynamic in terms of output and employment growth”.

11 THE DC REGIONS IN THE CREATIVE ECONOMY: A BENCHMARK

This chapter summarizes the performance of each of the DC regions within the network. Each region's position within the network is visualised in a barometer both against the 'best DC region' and against the 'average DC region'. The DC barometer contains one or more indicators from each of the different elements of the DC model (see Figure 3). Table 62 gives an overview of the indicators used in the DC barometers.

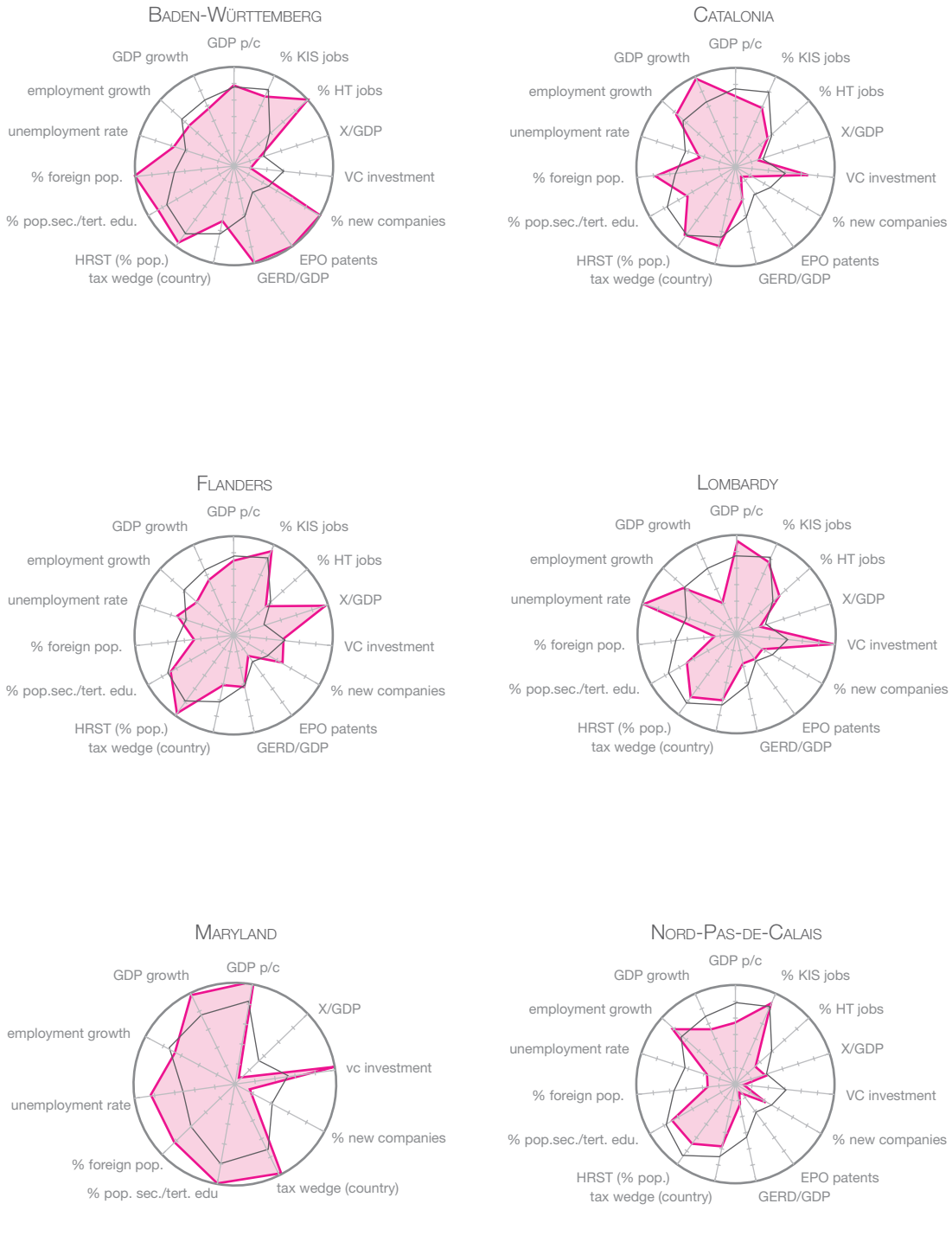
→ Table 62 Indicators in the DC barometer

REGIONAL WEALTH	
- GDP p/c	Regional gross domestic product per capita, 2003
- GDP growth	Average annual real GDP growth, 1998-2003
- Employment growth	Average yearly growth 1998-2002
- Unemployment rate*	Unemployment rate as % of labour force (15-64), 2003
POPULATION	
- % foreign pop	% foreign born persons or foreign nationals in population, most recent available year.
- % pop. sec./tert. edu	% of population who have completed at least secondary education (including those with tertiary degrees or higher)
- HRST % pop	% of population with either a degree or a job in science & technology, 2004, Quebec 2001
HARD AND SOFT LOCATION FACTORS	
- Tax wedge (country)*	The tax wedge is the difference between the salary cost paid by an employer and the net wage the employee receives, 2003
INNOVATION	
- GERD/GDP	Gross expenditure on Research & Development in GDP, most recent available year.
- EPO patents	EPO (European Patent Office) patents per million inhabitants, 2002
ENTREPRENEURSHIP	
- % new companies	% of new companies in total number of active companies, 2004
- VC investment	Venture capital investment as % of regional GDP, 2003
INTERNATIONALISATION	
- X/GDP	Exports as % of regional GDP, 2002
SECTOR ANALYSIS	
- % HT jobs	Employment in high tech industries as % of total employment, 2004
- % KIS jobs	Employment in knowledge intensive services industries as % of total employment, 2004

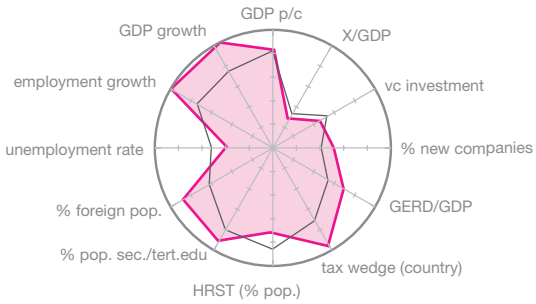
* unemployment rate and tax wedge are inversed, so that higher values on these indicators are shown as a lower score on the barometer and vice versa (e.g. a low unemployment rate is represented by a high score on the barometer, indicating a good performance by the region).

In the DC barometers each region's performance is represented by a coloured surface. This performance can be compared with the 'best DC region' and the 'average DC region'. For each indicator in the DC barometer data for the best performing region were scaled at 100, making the outer line in the DC barometers equal to the 'best DC region', a fictive region that combines the best of all DC regions for each indicator. The gap between a region's performance and this best performing region, is represented by the distance between the score of the region and the outer line of the barometer. Besides this 'best DC region', the 'average DC region' is also portrayed in the barometer. It contains for each indicator the unweighted average of all regions. Again, the gap between a region's performance and this average DC region's performance is represented by the distance between the score of the region and the graph of the average DC region.

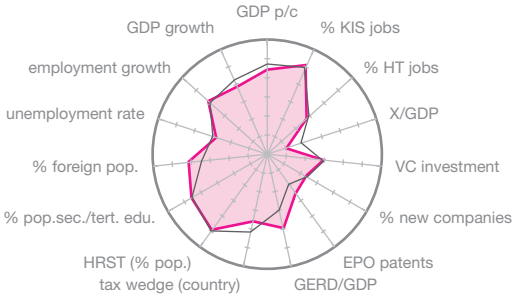
→ Figure 30 DC barometers of the regions



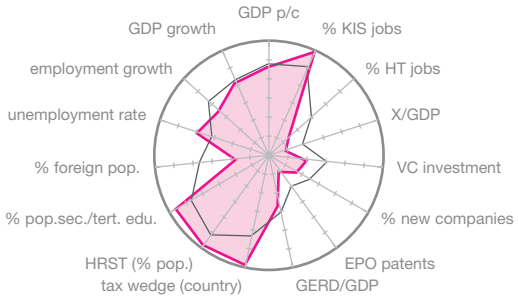
QUEBEC



RHÔNE-ALPES



SCOTLAND



*: For Maryland and Quebec some indicators were not available or not comparable.

Therefore, not all indicators are included in these regions' barometers.

Source: own calculations based on the indicators presented in previous chapters

Baden-Württemberg is the best performing region on several indicators. It is the highest spender (3.89% of GDP) on research and development and the only region spending more than the 3.0% target set by the European Union at the Lisbon Council. This research investment results in the highest number of EPO patents (per million inhabitants). With its well educated workforce and a high number of people in science and technology, Baden-Württemberg has the highest share of high tech manufacturing jobs. Employment in knowledge intensive services on the other hand, is lower than average. Despite below average investments of venture capital in the region, Baden-Württemberg is characterised by the highest birth rate of new companies. The DC barometer also shows that, although performance on innovation and technology indicators is outstanding, this is not translated in an above average improvement of its competitive position: both GDP and employment growth are below average.

In contrast to Baden-Württemberg, Catalonia's GDP has increased rapidly. However, this is mainly a catching up with the rest of the DC network: GDP per capita is still below the average of the DC regions. Unemployment is quite high (10.0%), but the number of jobs has grown faster than average. However, the proportion of people employed both in knowledge intensive services and in high tech manufacturing is below average, indicating that Catalonia's economic structure does not yet reflect the creative economy. R&D expenditure is also relatively low, as is the number of EPO patents.

Flanders is characterised by an extremely open economy with very high exports. However, the share of high tech in total export is relatively small. Unemployment is high, and job creation and GDP growth are slower than average. Despite some tax reforms, high taxes continue to be a problem. The share of newly established companies is higher than average, however most of these firms remain micro-organisations. Flanders has the highest share of human resources in science and technology. Spending on R&D and employment in knowledge intensive services hover around the DC average. However, employment in high tech manufacturing industries has decreased in recent years.

Lombardy's GDP per capita is high, but growing at a slow pace. The unemployment rate is lowest of all DC regions and employment is still growing at an average rate. Venture capital investment is high in Lombardy and employment in high tech manufacturing is above average. However, despite this high proportion of high tech manufacturing jobs, spending on R&D and the number of patents are below average.

While employment has grown faster than the average, Nord-Pas-de-Calais still has the highest unemployment rate of all DC regions. GDP per capita is low, and growing slower than average. Spending on R&D (0.7%) is at the lowest level within the DC network and the number of EPO patents is the lowest of the European DC regions. Most of the new jobs were created in low tech manufacturing. As a result the share of high tech manufacturing jobs remains low. Employment in knowledge intensive services on the other hand is average.

Rhône-Alpes is an average performer on all indicators. The region shows no major weaknesses in the DC barometer, nor does it have major strengths. R&D spending and the number of patents are above average. Employment indicators are all very close to the DC average. The share of foreign population is higher and GDP is growing slower than average.

Despite a slow growth in employment, the unemployment rate in Scotland is below average. The population is well educated, with a high share of human resources in science and technology. However, performance on other technology indicators, like R&D spending, patents and high tech employment is low. Venture capital investment and the proportion of new companies are also low. Scotland has the lowest proportion of high tech manufacturing jobs, but the highest proportion of employment in knowledge intensive services.

Maryland has the highest GDP per capita, and a very high GDP growth. Employment growth was average, but unemployment is low. The proportion of foreigners is high and the population is well educated. Maryland has the most favourable tax rates and the highest venture capital investments of the DC regions. Exports and the proportion of new companies are low.

Quebec has the fastest growing GDP of all regions. Per capita GDP and export are average. While the region had the highest growth in employment, the unemployment rate remains relatively high. However, unemployment is mainly a short term problem; long term unemployment is low. Quebec's population is culturally very diverse and well educated. Spending on R&D is high, but the share of human resources in sciences and technology is low. As in Maryland, taxes in Quebec are lower than in the European DC regions.

The previous paragraphs show that the DC barometers are a powerful instrument for getting a good first impression of how a region is performing in the creative economy within the DC network. For each individual indicator this tool allows each region to benchmark itself against the best performing region on the one hand and against the average performing one on the other.

However, these barometers do not provide a complete image of each region's creative potential and performance. First, the selection of indicators was limited to those where comparable data were available for all (or most) regions. As a consequence, for some elements of the DC model, second best indicators had to be selected for inclusion in the DC barometers. Second, except for GDP and employment growth, the barometers give a static image of the regions. While some regions score low on an indicator, this low score can be compensated by high growth. Others regions may score higher, but experience a slower or even negative growth. Despite these shortcomings the DC barometers are a practical tool in making a first evaluation of a DC region's performance in the creative economy. The previous chapters should be seen as essential additional information to these DC barometers to get a more complete and broader view on each of the different elements.

12 CONCLUSION AND SOME PUBLIC POLICY IMPLICATIONS

The creative economy, myth or reality? The aim of this research was certainly not to add specifically to this debate. However, the data of the DC regions that have been collected and analysed in this report clearly illustrate that over the last decade at least the economic tissue of all DC regions without any exception has changed significantly to a structure where more and more the production and exploitation of the intangible good 'knowledge' takes a central position. This reorientation has found its embodiment in significant increases in employment in knowledge related industries, not only in high tech manufacturing but even more in knowledge intensive services and core creative industries. As regions more and more focus on these industries with high growth potential for the future, they ensure not only today but also for the future the sustainability of their welfare.

The successful reorientation of regions towards a 'creative learning region' depends on many elements, individuals and interactions. The specific characteristics of a region influence the way in which regions evolve over time. The aim of this report was to collect data and position regions against each other on several aspects that are found to be critical in the development of a 'learning region': population and human capital, soft and hard location factors and the creative processes innovation, entrepreneurship and internationalisation.

The benchmarking in itself however does not deliver concrete policy recipes, nor should it. It is not possible to define one single strategy that should be followed by all regions, taking into account regional differences in geographical location, industry structure, social capital, etc. Each region should, on the basis of this report that highlights the prerequisites of the creative economy and shows each region's strengths and weaknesses, elaborate its own strategy within the parameters set by local economic and social conditions. This means that if one region scores well on one particular indicator, its policy as to that should not be simply copied to other regions, but it should be adapted to specific regional circumstances. Also, developing a regional strategy may mean that choices have to be made: high performance on all aspects of the creative economy may be hard to realise.

However, although regions have to develop policy instruments and strategies tailored to their situation, this does not imply that a benchmark study across regions is useless and that nothing can be learned from looking across the border. An overview of the existing literature and cases on learning regions and the creative economy learn that many aspects return time over time. They form the general conditions of what the creative economy stands for. It is here that this benchmark exercise can prove its value. Regional policy should come from an interaction between learning about one's performance on these general aspects of the creative economy and the specific characteristics of regions.

Public policies in the creative economy, particularly those relating to science and technology, industry and education, will need a new emphasis in the creative economy. Acknowledgement is needed of the central role of the firm, the importance of innovation systems which can efficiently distribute knowledge and information and the requirements for infrastructures and incentives which encourage investments in research and training (OECD, 1996).

The OECD distinguishes three general policy priorities for regions wishing to move towards a creative, knowledge-based economy:

- Enhancing knowledge diffusion – Support to innovation will need to be broadened from "mission-oriented" science and technology projects to "diffusion-oriented" programmes. This includes providing the framework conditions for university-industry-government collaborations, promoting the diffusion of new technologies to a wide variety of sectors and firms, and facilitating the development of information infrastructures.
- Upgrading human capital – Policies will be needed to promote broad access to skills and competencies and especially the capability to learn. This includes providing broad-based formal education, establishing incentives for firms and individuals to engage in continuous training and lifelong learning, and improving the matching of labour supply and demand in terms of skill requirements.
- Promoting organisational change – Translating technological change into productivity gains will necessitate a range of firm-level organisational changes to increase flexibility, particularly relating to work arrangements, networking, multi-skilling of the labour force and decentralisation. Governments can provide the conditions and enabling infrastructures for these changes through appropriate financial, competition, information and other policies.

The central role of public policy makers in the creative economy lies in establishing the right conditions and incentives that facilitate and promote learning, both at the individual and organisational level, as well as stimulate learning processes within and between regional networks. The DC model illustrates that this is a complex process that requires the interaction and collaboration of many different actors and the design of effective supportive institutions. The DC model and the DC barometers offer an interesting instrument to assess the effectiveness and efficiency of newly designed policy measures in relation to the distinguished creative processes behind the economic performance of a creative learning region.

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→ Table 63 | OECD Classification of manufacturing industries based on technology intensity

	ISIC Rev.3*
High-technology industries	
Aircraft and spacecraft	353
Pharmaceuticals	2423
Office, accounting and computing machinery	30
Radio, TV and communications equipment	32
Medical, precision and optical instrulments	33
Medium-high-technology industries	
Electrical machinery and apparatus, n.e.c.	31
Motor vehicles, trailers and semi-trailers	34
Chemicals excluding pharmaceuricals	24 excl. 2423
Railroad equipment and transport equipment, n.e.c.	352+359
Machinery and equipment, n.e.c.	29
Medium-low-technology industries	
Building and repairing	351
Rubber and plastics products	25
Coke, refined petroleum products and nuclear fuel	23
Other non-metallic mlineral products	26
Basic metals and fabricated metal products	27-28
Low-technology industries	
Manufacturing, n.e.c.; Recycling	36-37
Wood, pulp, paper, paper products, printing and publishing	20-22
Food products, beverages and tobacco	15-16
Textiles, textile products, leather and foorwear	17-19

* UN Classification of economic activities

Source: OECD Science, Technology and Industry Scoreboard 2003 - Towards a knowledge-based economy.

→ Table 64 Eurostat classification of services based on technology intensity

	NACE Rev.1.1.**
Knowledge-intensive-high-tech services	
Post and telecommunications	64
Computer and related activities	72
Research and development	73
Knowledge-intensive market services (excl. financial intermediation and high-tech services)	
Water transport	61
Air transport	62
Real estate activities	70
Renting of machinery and equipment without operator, and of personal and household goods	71
Other business activities	74
Knowledge-intensive financial services	
Financial intermediation, except insurance and pension funding	65
Insurance and pension funding, except compulsory social security	66
Activities auxiliary to financial intermediation	67
Other knowledge-intensive services	
Education	80
Health and social work	85
Recreational, cultural and sporting activities	92
Less knowledge-intensive market services	
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	50
Wholesale trade and commission trade, except of motor vehicles and motorcycles	51
Retail trade, except of motor vehicles and motorcycles; repair of personal and houshold goods	52
Hotels and restaurants	55
Land transport; transport via pipelines	60
Supporting and auxiliary transport activities; activities of travel agencies	63
Other less knowledge-intensive services	
Public administration and defence; compulsory social security	75
Sewage and refuse disposal, sanitation and similar activities	90
Activities of membership organization n.e.c.	91
Other service activities	93
Private household with employed persons	95
Extra-territorial organizations and bodies	99

** Classification of economic activities in the European Community

Source: Eurostat

APPENDIX B: EASE OF DOING BUSINESS INDEX

The ease of doing business index is calculated as the ranking of the arithmetic mean of country percentile rankings on each of the ten topics covered. The ranking on each topic is the arithmetic mean of the percentile rankings on its component indicators (WB and IFC, 2005).

The general ease of doing business ranking takes into account the following elements:

Starting a business:
- procedures (number)
- time (days)
- cost (% of income per capita)
- minimum capital to open a new business (% of income per capita)

Dealing with licenses:
- procedures (number)
- time (days)
- cost (% of income per capita)

Hiring and firing workers:
- difficulty of hiring index
- rigidity of hours index
- difficulty of firing index
- rigidity of employment index
- hiring cost (% of salary)
- firing costs (weeks of wages)

Registering property:
- procedures (number)
- time (days)
- cost (% of property value)

Getting credit:
- legal rights index
- credit infromation index
- public registry coverage (% adults)
- private bureau coverage (% adults)

Protecting investors:
- disclosure index
- director liability index
- shareholder suits index
- investor protection index

Paying taxes:
- payments (number)
- time (hours)
- total tax payable (% of gross profit)

Trading across borders:
- documents for export (number)
- signatures for export (number)
- time for export (days)
- documents for import (number)
- signatures for import (number)
- time for import (days)

Enforcing contracts:
- procedures (number)
- time (days)
- cost (% of debt)

Closing a business:
- time (years)
- cost (% of estate)
- recovery rate (cents on the dollar)

→ Table 65 Country rankings on Ease of doing business sub-indicators, dataset January 2005

	Starting a business	Dealing with licences	Hiring and firing workers	Registering property	Getting credit
United States	3	17	6	12	15
Canada	1	21	24	27	10
United Kingdom	9	29	15	23	1
Belgium	34	31	43	141	45
Germany	47	20	131	33	5
Spain	86	50	150	37	29
France	13	23	142	144	115
Italy	45	93	138	48	51
China	126	136	87	24	113
India	90	124	116	101	84

	Protecting investors	Paying taxes	Trading accross borders	Enforcing contracts	Closing Business
United States	7	30	17	10	17
Canada	3	12	13	34	4
United Kingdom	9	81	21	30	10
Belgium	13	33	9	17	9
Germany	57	54	3	25	30
Spain	94	25	10	24	16
France	56	35	44	13	32
Italy	86	102	90	76	40
China	100	119	48	47	59
India	29	103	130	138	118

Source: WB and IFC,2005

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